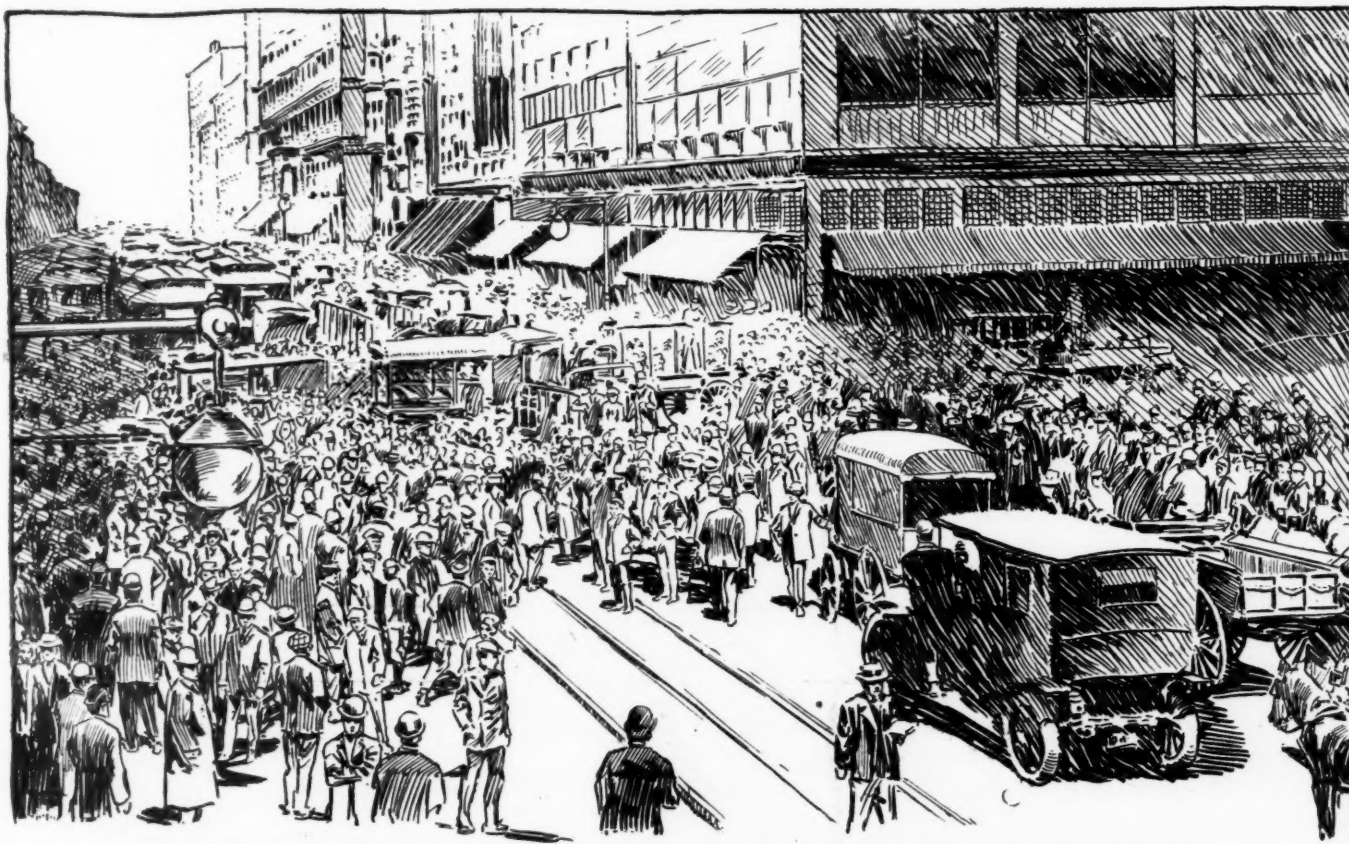


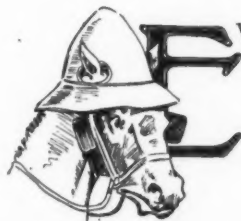
THE AUTOMOBILE

New York Traffic Problem Serious

Police Insufficient in Number—Travel Must Be Diverted to Parallel Streets—Elimination of Horses Would Relieve Pressure—Pedestrians Must Be Controlled



How metropolitan street traffic piles up when steady progress of vehicles is impeded for even a few minutes



EVEN when the horse shall be eliminated from urban traffic, as he bids fair to be within the measurable future, the problem of street congestion will be one of the most urgent puzzles to be solved by communities all over the world within the next 10 years.

Today New York has approximately 40,000 automobiles of one kind and another. In 10 years' time it is not at all unlikely that there will be 140,000, and many hopeful members of the automobile fraternity place the figures at 200,000.

Exclusive of motor buses and taxicabs, there are at the pres-

ent time in daily use in carrying passengers in Greater New York on elevated and surface roads 8,836 vehicles. These transported during the past year the immense total of 1,617,182,963 passengers, a daily average, estimating Sundays and holidays as ordinary business days, of 4,430,638 passengers. While there is no means of accurately estimating the proportion of this traffic which eventually reaches the section south of Central Park, it is safe to say that half this immense total helps to form the human element in the problem which sooner or later must be solved if the preservation of life and the smooth transaction of business in the largest city of the western hemisphere be considered.

Of the total of 8,836 public passenger-carrying vehicles men-



Without this modern Centaur, the pedestrian's progress across New York's highways would be practically impossible. Some street scenes showing how vehicles accumulate during a 15-second stoppage

tioned above as constituting the rolling stock of the Greater New York transportation companies, no less than 5,150 run on tracks laid on the surface of the ground. Of these fully 75 per cent. navigate the section south of Central Park, and form of themselves one of the greatest factors in the problem of traffic management. During the past year these surface cars carried 834,024,416 passengers. In other words, each day there alight from surface cars in the metropolis 2,284,998 human beings who at once become important elements in the immense task imposed upon the city's guardians. The safeguarding of the proportion of this great throng that finds its way into that section of the city where the vehicular traffic has already brought about a condition of near-congestion is the task that confronts the police department of Greater New York at the present time. With the passage of the years these figures will increase in proportion with the increase in the number of automobiles, pleasure and business, and with the number of surface cars, if not with the number of horse-drawn vehicles, for it is the one fortunate phase of this situation that the number of horses to be found on the streets of the great city is gradually growing smaller with each succeeding year.

Daily Traffic Is Tremendous

One glance at the traffic that passes Fifth avenue and Forty-second street in any minute of the 10 hours from 10 o'clock in the morning until 8 o'clock at night is sufficient to show the major character of the problem that will be presented when there are twice, three or five times as many motor vehicles in service in New York as there are now.

Even in the heart of summer, when it is estimated that at least 30 per cent. of the local automobiles are not in use in town, the traffic is impressive during about 4 hours each day. Actual experiments with a stop-watch showed an average of fifty vehicles a minute moving over the crossing in both direc-

tions and for a while, between 3 and 4 o'clock in the afternoon, the average ran up to sixty-four cars a minute.

When the traffic policeman blows his whistle for the cars to halt either east and west, or north and south, a jam of automobiles results almost instantly. The cars pile up for a block back of the crossing in less time than it takes to tell it and at the same time the blocked cars in the transverse street move rapidly across the avenue, or street, as the case may be.

Ordinarily the way is left open across Fifth avenue for only 15 seconds at a time, while the north and south traffic is allowed to flow for 45 seconds during the most congested hours. A positive check on the Fifth avenue traffic for 2 minutes would serve to block traffic for a half mile and one such delay has often had the effect of choking vehicular movement for an hour.

Horses Complicate Situation

The elimination of horses would go far toward making the passage of the streets more comfortable and if such a result could be produced within a reasonable time, the chances are that the natural increase in automobile traffic would not reach the impossible stage, even on the streets in use at the present time, until the number of cars in use touched the 100,000 mark.

But with the streets freed from the horse and with only the present facilities for handling automobiles, the advent of 100,000 cars would make for chaotic conditions.

In crossing Fifth avenue any afternoon when the shopping, business and theater-going public is abroad, it takes an alert mind and responsive muscles to keep out of trouble. Two robust traffic officers are stationed at the crossing. When the whistle is sounded for travel in a certain direction to stop, it stops, and with it pedestrians moving in that direction stop also, if they are wise.

When the signal is to stop the north and south movement,

the street-cars, cabs, wagons and automobiles in the cross-street are motioned to come on. As far as vehicular traffic is concerned, such a signal is simple enough to understand and follow, but when it comes to the pedestrians, there is a different story to tell. The vehicles proceed along the right side of the street in the direction in which they are going, but the pedestrians move both ways on both sides of the street. This results in collisions and congestion and, while accidents are rare indeed where the police are stationed, any day's experience will show the potential possibilities. Often groups of pedestrians will dart from the sidewalk, passing in front of a halted file of automobiles just as the signal is given to move. If the street is crowded, they may be obliged to stand between two lines of rapidly moving cars, flanked by two lines of slower-moving vehicles, until the policeman signs for the procession to halt. There are several hours a day when it would be like inviting accident to attempt to cross Fifth avenue except when the traffic is halted.

The handling of this current of travel is admirably accomplished by the traffic squad. Policemen have never reached a higher expression of perfection than in this division of the New York force, and yet present facilities are close to their limit of usefulness and the influx of thousands of additional cars must mean more traffic policemen and a slower rate of travel.

Traffic Outgrowing Regulation

The traffic squad of Greater New York is made up of approximately 500 men, of whom 65 per cent. are assigned to duty in the business sections of the city during the day; but so rapid has been the growth of the traffic in these sections that it is fast outgrowing the means of properly taking care of it. True, a certain proportion of the regular police on fixed post assist in straightening out traffic tangles; but the rules require that they stick close to their stations, and in the event of a tie-

up anywhere else but in their immediate neighborhood they are usually of but little assistance in relieving the congestion.

The solution of the difficulty is highly complex. In the first place, no matter what is done, the present courses of traffic are not sufficient to carry 100,000 automobiles. Therefore, the prime essential is the use of more streets to carry such a volume of traffic. The time will come when all the numbered avenues must be paved and maintained as Fifth avenue is today, or better. With fifteen main arteries to carry the flow of travel where three or four are used to any extent now, the physical necessities of the case would be ameliorated. Sixth avenue, with its elevated railroad pillars and wicked pavements, could be arranged to relieve the situation by taking a portion of the business traffic and certain of the parked and boulevarded streets could be set aside exclusively for the passenger travel. There are enough avenues to carry ten times the present amount of traffic and the difficulty lies in the fact that everybody wants to use Fifth avenue, Park and Fourth avenues and Broadway.

Horses Handicap Automobiles

Second, while horse-traffic is decreasing, there are still a tremendous number of equine obstacles to progress in New York. If there were no horses there could be four lines of rapidly moving vehicles on some of the avenues instead of two rapid and two slow lines. It would be possible to move 100 vehicles a minute past a given point on Fifth avenue without endangering the lives of automobilists or pedestrians. At present, the extreme number of automobiles that can be thus handled is less than fifty a minute. In the figures given above, horse-drawn vehicles are reckoned in the totals.

Third, the experience of years has shown that, where the traffic is under the direction of the police, accidents are negligible in number. This, of course, does not take into account the reckless handling of automobiles contrary to law and against the orders of the police. It follows, therefore, that increased



The traffic officer must be the sole judge of the conditions at his particular crossing. He should be given unlimited sway in the direction of traffic and drivers and pedestrians alike should obey him

traffic must carry with it a need for more traffic officers. As these factors affect traffic they rank as placed: First, more streets; second, the elimination of the horse; third, more traffic police.

The details of caring for five times the present volume of vehicular traffic present problems that come properly within the province of the various municipal departments. It is only fair to say that each department in the city of New York is already overwhelmed with suggestions for meeting the exigencies of the case. Some of the suggestions display marvels of ingenuity and range all the way from subways for pedestrians, elevated platforms and other ideas based upon the desire for safety without reference to cost, to the most visionary dreams of unbalanced minds.

The first step toward solving the problem will be the enactment of a new motor vehicle law. Just what this should contain is a matter upon which almost everybody has some ideas, and most of them are divergent. It would seem that a provision should be inserted to give the traffic squad control of pedestrians as well as vehicles. All citizens have an equal right in the streets and the pedestrian has the right of way over the vehicle at the regular crossings. That being so, it would seem simply good judgment on the part of the pedestrian to move only when the police guardian of the crossing deems it safe for such procedure. The policeman, knowing that the pedestrian has the right of way, cannot arbitrarily hold him longer than his safety seems to require.

Conditions Same in Other Cities

The experience of other American cities is very similar to New York's. In Chicago, where, from the topography of the city, there is not such a prospect of congestion in the outlying districts, the loop section is almost as badly crowded and the stream of traffic requires very strenuous efforts on the part of the police to keep it flowing. In Philadelphia the situation is somewhat better, owing to the way the city is spread out between the rivers. But in all of them the problem of handling vehicular traffic will become acute sooner or later and, for that reason, the eyes of the country are upon New York and Chicago, particularly the former, to learn how the big towns will go about the solution.

In London, where the horse has all but disappeared from the more congested sections, 400 persons were killed and 10,000 persons were hit by vehicles during 1911.

Crossing from the south side of the Strand to Cockspur street the pedestrian has to avoid eight files of fast moving vehicles, four lines moving in each direction. The city of London is now at work upon the idea of a traffic board, which has been recommended to consider the matter of vehicular traffic by a royal commission.

According to the conclusions of the British investigators of the subject, there is nothing that can be done to check automobile traffic, because it represents the highest stage to which the art of transportation has been developed. Therefore, the energies of the Britons will be directed toward regulating and diverting traffic from certain streets so as to avoid congested conditions.

An idea of the volume of New York traffic may be gained from a consideration of the following facts:

Average number of automobiles that pass Forty-second street on Fifth avenue each day is 11,432.

Average number in summer between 3 and 4 o'clock in the afternoon, 2,940. In winter, the rush hour sees about 3,500.

These figures do not represent as many cars as they seem to, because, in many cases, the same car passes twice or more during the illustrated period.

Lord Montagu, editor of *The Car*, during his recent visit to New York, remarked that, in his opinion, "the solution of New York's transportation problem is the omnibus. With this type of vehicle," he stated, "the driver has more freedom to wind in and out of the traffic and is not compelled to remain on one set of tracks."

The claim was also advanced that the city policeman was an important factor in the situation and this proved the subject of an intensely interesting address by Chief Justice McAdoo, who made comparisons between the city policeman of London and New York. In considering the former, he stated that, in London, "every traffic policeman is an inspector of vehicles. He has the power to order off the streets any car which is undesirable on account of its appearance, or by reason of any doubt as to its safety. Any car that is ordered off the streets cannot get back until it has passed through a special examination."

Lord Montagu also expressed considerable surprise that any one owning a car could drive the same about the streets of the city without first passing an examination establishing his competence as an operator.

With regard to the suggestion of Lord Montagu as to the effect of buses on New York traffic congestion, it may be said that there are over 2,000 motor-buses in use in London and it is contemplated to increase the total to 4,500 next year. It is interesting to note that of the 400 fatalities due to automobile accidents in London last year, 107 were the results of motor-bus accidents.

Hence, it might be reasoned that buses as operated in the British capital might not be the answer to the puzzle from the viewpoint of the pedestrian.

During the year beginning with July 1, 1911, and ending with June 30, 1912, the traffic casualties in New York were as follows:

Killed by automobiles.....	190	
Injured by automobiles		1,268
Killed by street cars.....	119	
Injured by street cars.....		851
Killed by wagons.....	165	
Injured by wagons.....		303
Total killed	474	
Total injured		2,422
Total casualties		2,896

Practically all of these mishaps occurred where there were no traffic officers on duty. In the item covering injured by wagons, the number is undoubtedly less than the actual number and the street car mishaps where the pedestrian was at fault and the injuries trifling is understated.

The showing is measurably worse than that of London, where there is a vastly larger population and congestion.

The National Highways Protective Association is working for uniform laws covering traffic in all the main centers in the United States.

Automobile as Naval Adjunct

LOS ANGELES, CAL., July 13—The fact that the automobile is really practicable for the use of landing parties was forcibly demonstrated recently when Lieutenant-Commander A. H. Woodbine of the Seventh and Eighth Divisions, Naval Militia of California, took a full gun crew of thirty-three officers and enlisted men, a one-pounder weighing 800 pounds and three drivers to Pasadena in three Oldsmobile cars furnished for the test by Captain Ryus of Los Angeles.

The cars used were the three leading types of the Oldsmobile line. Captain Ryus drove the Limited, in which the commanding officer rode with the gun and gunners; Ensign Linck had the Autocrat in which the caisson was carried, with ten members of the crew, and the Defender was in command of Ensign Smith. In this car, the smallest of the trio, thirteen men rode, and it kept its position right behind the big Limited, which played the part of the flagship.

The gasoline fleet covered the distance from Los Angeles to Pasadena armory in 21 minutes. The gun, which was mounted on the tonneau of the Limited, rode perfectly, and it was not necessary for the gunners to give it any attention whatever on the way.

Legal News of the Week

Receiver Authorized to Sell Atlas Engine Works on July 29—President Hanna Protests

Suit Over Taxicab Company Names—Motor Cabbies Fined for Maintaining Nuisance

INDIANAPOLIS, IND., July 15—Judge Clarence E. Weir, of the superior court, has authorized Fred C. Gardner, receiver for the Atlas Engine Works, to sell the company's property and has fixed July 29 as the date of sale. The only bidder in sight at this time, is a motor car concern in Detroit.

The date of sale was fixed over the protest of Hugh H. Hanna, Sr., president of the company, who owns all of the common stock, some of the preferred stock and who is also indorser on \$1,100,000 in notes of the company given 5 years ago, when a creditors' committee took charge of the plant. Mr. Hanna, through his attorneys, contended the sale should not take place for at least 60 days, in order to permit proper advertising in trade journals and to enable him to have an opportunity to undertake to finance a bid on the property himself.

Attorneys for the receiver, however, opposed Mr. Hanna's suggestion. They contended if the sale were delayed or not made to the prospective purchaser in sight the bondholders would not receive 50 cents on the dollar and other creditors of the company would lose everything.

In the proposed terms of sale, which have been agreed to by the receiver and the prospective purchaser, the common stock, preferred stock and the \$1,100,000 notes indorsed by Mr. Hanna will be eliminated and nothing paid on them. The stocks and securities of the company have not been listed for several years, but a manual issued in 1906 states that the authorized common stock was \$1,000,000 with \$750,000 issued and the preferred stock bearing 6 per cent. interest, \$1,000,000, all of which was issued. The undivided profits in 1904 were \$60,969.95 and in 1905 the undivided profits were \$66,343.44.

The prospective purchaser proposes to assume a mortgage against the property securing bonds amounting to \$1,050,000, to pay \$105,000 indebtedness incurred in a bond issue of \$150,000 and turn over enough cash to the receiver to pay all mercantile accounts contracted since a creditors' committee took charge, as well as the salary rolls and receivership expenses, amounting to about \$80,000, which has been fixed as the upset price. The purchaser is to cancel the bonds.

It is said the proposed purchaser, if it gets the property, may not continue the manufacture of Silent Knight motors or crude oil engines, but will make a line of four-cylinder cars selling at from \$1,200 to \$1,500.

Decision Soon in Klaxon vs. Waite

PROVIDENCE, R. I., July 13—Judge Brown, of the United States district court, who heard the case brought against the Waite Auto Supply Company for an injunction on behalf of the Lovell-McConnell Manufacturing Company, the Hutchinson Electric Horn Company and the Miller-Reese-Hutchinson Company to restrain the former company from selling the Klaxon and Klaxonet horns, has taken the case under advisement and will render a decision shortly.

Taxicab Companies' Names Confuse

BOSTON, MASS., July 13—Franklin T. M. Hammond, who was appointed master in the suit brought by the Taxi Motor Cab Company, of Boston, against the Motor Cab Company, of Boston, for an injunction to restrain the latter company from using

that name has filed his report with the Supreme Court of Massachusetts and a decision is expected shortly. The Taxi Motor Cab Company operates about fifty vehicles with taximeters, and has its headquarters at 541 Tremont street, South End. The Motor Cab Company operates its cabs without taximeters, basing the fares on the hackney cab rates, and its headquarters are the Hotel Somerset, Back Bay. Neither company has its name on its cabs to tell them apart, and the plaintiff claims the similarity of names brings confusion. The master in his report says the ordinary traveler is ignorant of the fact in which company's cab he is riding and that confusion results and the name of the defendant will be likely to be mistaken for that of the plaintiff. An injunction may be granted therefore.

Motor Jehus Fined as Nuisances

PHILADELPHIA, July 15—That automobiles bearing "to hire" signs standing on certain of the principal thoroughfares in the central section of the city are an obstruction to traffic and a nuisance, is the gist of a decision rendered recently by Magistrate MacFarland in the Central Court, who held two chauffeurs under \$200 bail each for court for permitting their machines to stand in front of the Bingham Hotel after being warned not to do so. On the part of the accused it was contended that discrimination was practiced by the police in ordering some cars away while not molesting others, but in the case of the latter it was claimed by the police that they held permits. As no permits are issued, Magistrate MacFarland said that all chauffeurs similarly charged with obstructing the highways were to be arrested.

Broke Law in Setting Speed Trap

BUFFALO, N. Y., July 15—Because they failed to file with Secretary of State Lazansky a notice of their intention to create an ordinance governing the speed of motor vehicles and because the state law prohibits enforcement of ordinances in cities other than those of the first class restricting speed of motor vehicles to less than 15 miles an hour, the Salamanca, N. Y., police department violated the law when they arrested motorists who were driving 12 miles an hour and fined them various sums. At the trial of the motorists, it developed that the Salamanca police placed the speed trap in operation so that a deficit in the Salamanca department could be offset.

A NUMBER of new licenses have been issued by Dyer, Dyer & Taylor to automobile owners in New York and the metropolitan district. About half of these licenses cover imported cars, while the remainder is made up largely of Sultan automobiles. The list of licenses and the cars owned by them is as follows:

Alexander Krull, Queen; William A. Delano, Lancia; John H. Cooper, Lancia; Michael J. Bird, Sultan; Ludwig Kraus, Darracq; James Bernshaw, Darracq; Thomas Callahan, Sultan; Washington Garage Company, Sultan; David Rumsey, Lancia; Alwin Young, Sultan; Adolph S. Berquist, Rochet-Schneider; Joseph G. Fornecker, Sultan; David H. Gaines, Zust; L. H. Cuneo, Itala; J. Applegate & Company, Cortlandt; C. F. Welch, Cleveland; John H. Meyer, Isotta; Joseph Lacherque, Sultan; John H. Bowers, Sultan; J. F. Pierson, Jr., S. P. O.; Peter Pavlovich, Charron; John A. Camera, Sultan; Hector Califfe, Sultan; Frank J. Tampone, Sultan; Dr. George H. Smith, Cleveland; John Kostukevich, Sultan.

C. A. Glentworth, the New York agent for Napier cars, has paid Dyer, Dyer & Taylor damages for infringement in acknowledgment of the basic Dyer patents.

DAYTON, O., July 15—Entry of settlement and dismissal was filed in the common pleas court in the action brought by Bert Shroyer against the Peckham Motor Car Company for \$1,800. The \$390.30 suit brought against the same concern by the Michelin Tire Company was also settled up and dismissed.

Board of Trade Meeting

New York Show Will Open in Two Buildings on Night of January 11, 1913—Republic Plans

Big Dividends by Canadian Ford and Reo Companies—Amplex Company to Start on August 1

THE Automobile Board of Trade at its quarterly gathering in New York City Thursday listened to the report of the Show Committee, covering plans for the big exhibition of next January, which will be conducted in two buildings, the new Grand Central Palace and the Madison Square Garden, with a single admission covering both buildings.

It was definitely decided to open the show on the evening of January 11, 1913, with an exhibition of pleasure cars in both buildings, continuing until the 18th. The commercial vehicle division, which will be held in both buildings, will open on the evening of Monday, January 20, closing on Saturday evening, January 25.

Suitable resolutions were passed on the death of Mr. Alfred N. Mayo, of the Knox Automobile Company, one of the oldest members of the Automobile Board of Trade and a leader in the industry since its inception.

It was also voted to begin compilation of data for the publication of the 1913 handbook.

Among the companies represented at the meeting were the Autocar, Buick, Cadillac, Cartercar, Chalmers, Cunningham, Elmore, Franklin, Garford, Haynes, Hudson, Knox, Lozier, Marquette, Matheson, Mercer, Metzger, Mitchell, Moline, Moon, Marmon, National, Oakland, Olds, Packard, Peerless, Pierce-Arrow, Pope, Premier, Pullman, Rapid, Reliance, Stearns, Thomas, White, United States Motors, Overland and Winton.

Amplex to Resume on August 1

MISHAWAKA, IND., July 13—Operations at the plant of Amplex Motor Car Company, which recently underwent reorganization, will begin about August 1. W. J. Mead, president of the concern, announces that the daily output of the company will be five cars. It is the intention to employ between 750 and 1,000 men. Mr. Mead will soon take up his residence in Mishawaka. E. C. Wetten, the secretary of the company, is a Chicago attorney. Considerable interest attaches to the announcement that the two-cycle cars which the concern has been making will be discontinued. A six-cylinder, long-stroke, pocket-valve car of standard design is planned and a Knight type motor machine to be made in limited quantities. There will be no change in the Amplex chassis.

Locomotive Increases Capital Stock

BRIDGEPORT, CONN., July 16—In order to take care of real estate deals involved by the building of several large service buildings in some of the leading cities, especially New York, Chicago and Philadelphia, the Locomobile Company of America has increased its capitalization from \$5,000,000 to \$6,500,000.

Republic Motor Announces Its Plans

The Republic Motor Company of New York expects to be in full possession of its new headquarters at Eleventh avenue and Fifty-seventh street in 90 days. It has been learned that it intends to build two styles of car, a four-cylinder light type to be sold at \$715 and a six-cylinder five-passenger touring car to be sold at \$1,000.

W. C. Durant, president of the company, stated that it is the

belief of the concern that further economy in the automobile industry will not be in the manufacture of the car, but in its distribution. The Republic Motor Company is designed especially to secure greater economy in the distribution and to go still further in selling in each locality a car which is adapted especially to that vicinity. He stated that it was necessary for a car that was designed to meet all sorts of service to be a compromise, as a car designed for flat country would be under extreme disadvantages in hilly country. This condition is to be met by the establishment of ten factories in the largest distributing centers.

The parent company is the Republic Motor Company of Delaware which has been incorporated for \$65,000,000, the stock being divided into \$15,000,000 of 7 per cent. cumulative preferred and \$50,000,000 common. The ten operating companies are each incorporated at \$1,500,000. They all have the name of the Republic Motor Company and are located in New York, Boston, Philadelphia, Chicago, St. Louis, Kansas City, Minneapolis, Portland, O., Los Angeles and San Francisco. The Little Motor Car Company, of Flint, Mich., and the Chevrolet Motor Car Company, of Detroit, will, it is said, form a part of the Republic combination.

Companies Declare Big Dividends

WINDSOR, ONT., July 13—The Ford Motor Company, of Walkerville, has declared a dividend of 20 per cent. on the new issue of stock. The original capital was \$125,000, on which annual dividends were paid of 100 per cent. Then capital was increased to \$1,000,000, of which \$750,000 was paid up. On this

Automobile Securities Quotations

A downward trend characterized the week's stock market of automobile securities. Comparison of the table given below with the quotations of last week show that where changes occurred they were almost invariably in the nature of decreases. The tire stocks, which rallied last week on the ground of a possible consolidation of a number of independent tire makers, declined when these reports were officially denied. Goodyear held an exceptional position, proving strong and being the center of considerable activity. Firestone also scored a respectable advance. Among the automobile manufacturing securities Packard and Studebaker preferred stood almost alone with fractional rises, while the other stocks in this department either remained unchanged or declined.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co.	..	..	120	..
Ajax-Grieb Rubber Co.	..	..	..	100
Aluminum Castings, pfd.	..	..	100	..
American Locomotive, com.	40 3/4	41 1/4	41	41 1/4
American Locomotive, pfd.	..	..	108	108 3/4
Chalmers Motor Company	..	..	145	155
Consolidated Rubber Tire Co., com.	5	10	13 1/4	15
Consolidated Rubber Tire Co., pfd.	10	20	50	59
Firestone Tire & Rubber Co., com.	160	170	285	293
Firestone Tire & Rubber Co., pfd.	105	107	105	107
Garford Company, preferred	..	..	99	101
General Motors Co., common	54 1/2	55 1/2	31	33
General Motors Co., preferred	87 1/2	88 1/2	75	76
B. F. Goodrich Co., common, old	245	248	76 1/4	77 1/2
B. F. Goodrich Co., preferred, old	115 1/2	117 1/2	109	109 1/4
Goodyear Tire & Rubber Co., com.	230	240	315	320
Goodyear Tire & Rubber Co., pfd.	105	107	103	104
Hayes Manufacturing Company	..	..	..	97
International Motor Co., com.	..	..	23	25
International Motor Co., pfd.	..	..	83	85
Lozier Motor Company	..	..	50	60
Miller Rubber Company	..	..	145	150
Packard Motor Car, preferred	..	..	104 1/2	106 1/4
Peerless Motor Company	..	..	..	150
Pope Manufacturing Co., com.	51	55	30	31
Pope Manufacturing Co., pfd.	78	80	73	74 1/2
Reo Motor Truck Company	9	9 1/2	8 3/4	9 1/4
Reo Motor Car Company	19	20	19	20
Studebaker Company, common	..	..	29 3/4	31
Studebaker Company, pfd.	..	..	94	94 1/4
Swinehart Tire Company	..	..	98	100
Rubber Goods Company, common	88	93	100	..
Rubber Goods Company, pfd.	100	105	105	110
U. S. Motor Co., common	39	40	2 3/4	3 1/4
U. S. Motor Co., pfd.	79 1/2	80 1/2	10 1/2	12
White Company, preferred	..	..	107 1/2	108 1/2

amount dividend checks of 20 per cent. are being paid for the first half year, which amounts to about 120 per cent. on the original stock.

LANSING, MICH., July 15—The Reo Motor Car Company has declared another dividend of 10 per cent. and about \$200,000 in cash will be distributed. A few weeks ago a 10 per cent. dividend was declared, making a total profit of \$400,000 the stockholders have received this year. Nearly 75 per cent. of the dividends goes to Lansing residents. At the present time the plant is being run at full capacity, a car being turned out every 11 minutes. Two thousand men are employed, but the company is unable to keep up to the rush of orders.

How Canadians Attract Industries

BERLIN, ONT., July 15—After the officials of the Canadian Consolidated Rubber Company, makers of rubber tires for automobiles, expend \$250,000 in building and equipment of their factory in this city, they will be awarded a bonus of \$25,000 which has been raised by local property owners, and a fixed assessment for that amount for 10 years. This rubber concern, which already has large interests here, will purchase fifteen additional acres of land on which they will construct two mammoth tire factories. During the first year 100 skilled workmen will be employed at this plant, 200 the second and 500 in 5 years hence. That was an agreement reached before the bonus was awarded. Hamilton, Ont., tried hard to land this industry, which is considered the largest industrial proposition in the history of Berlin.

Market Changes for the Week

Business in the metal market was limited last week, and quotations declined slightly in the case of lead and more noticeably in that of tin. Copper and steel remained practically unchanged. Characteristic of the condition in the metal market is a general downward trend of the products of other than the iron and steel industry, while the demand for the products of the latter has fallen off when compared to what it was 2 or 3 weeks ago.

One of the most important developments of the week was the 3-cent rise in Para rubber which took place on Friday last. Fine Up-river sells now for \$1.15 a pound, and, while the activity of the rubber market is none too intense, the general tone is strong. A feeling of restriction noticed about a week ago was due to a vague apprehension that artificial rubber could possibly develop, in the near future, as a serious competitor of the natural product. The week's changes follow:

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.	.07	.07	.07	.07	.07	.07	.....
Beams and Channels, 100 lbs.	1.41½	1.41½	1.41½	1.41½	1.41½	1.41½	.....
Bessemer Steel, Pittsburgh, ton.	21.50	21.50	21.50	21.50	21.50	21.50	.....
Copper, Elec., lb.	.16¾	.16½	.16¾	.16¾	.17	.17	+ .00½
Copper, Lake, lb.	.17	.16¾	.16¾	.16¾	.17	.17	.....
Cottonseed Oil, July, bbl.	6.80	6.79	6.79	6.68	6.46	6.39	— .41
Cyanide Potash, lb.	.20	.20	.20	.20	.20	.20	.....
Fish Oil (Menhaden)	.38	.38	.38	.38	.38	.38	.....
Gasoline, Auto, 200 gals. @	.20	.20	.20	.20	.20	.20	.....
Lard Oil, prime	.85	.85	.85	.85	.85	.85	.....
Lead, 100 lbs.	4.70	4.65	4.65	4.65	4.70	4.67½	— .02½
Linseed Oil	.75	.75	.73	.73	.73	.73	— .02
Open-Hearth Steel, ton	22.00	22.00	22.00	22.00	22.00	22.00	.....
Petroleum, bbl., Kansas crude	.68	.68	.68	.68	.68	.68	.....
Petroleum, bbl., Pa. crude	1.60	1.60	1.60	1.60	1.60	1.60	.....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	.....
Rubber, Fine Up-river Para	1.12	1.12	1.15	1.15	1.15	1.15	+ .03
Silk, raw Ital.	4.15	4.15	4.15	4.15	4.15	4.15	.....
Silk, raw Japan	3.65	3.65	3.65	3.65	3.65	3.65	.....
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	.99	.....
Tin, 100 lbs.	44.60	44.75	44.50	44.50	44.25	44.12½	— .37½
Tire Scrap	.09	.09	.09	.09	.09	.09	.....

No Tire Merger Probable

Firestone and Goodyear Officials Say That Rumors Are Without the Slightest Foundation

Keeton Will Confine Its Energies to Six-Cylinder Cars—Will Brown to Head New Truck Company

A KRON, O., July 16—Publicity has been given during the week to reports tending to show that another big consolidation of rubber plants here is about to take place. The two firms mentioned are those of the Firestone Tire & Rubber Company and the Goodyear Tire & Rubber Company. It has been claimed that the same parties who worked out the Goodrich-Diamond merger are working out plans for the next two largest plants here. No sooner had the rumors appeared in print than vigorous denials were made by H. S. Firestone, president of the Firestone Company, and F. A. Seiberling, president of the Goodyear Company.

"There is absolutely no truth in these reports of consolidation," said Mr. Firestone. "The Firestone Tire & Rubber Company will not sell out to, consolidate with or absorb any other rubber company. The Firestone Company has sufficient capital stock and real cash to run the business, and there is no stock or cash consideration which will change that policy."

"There is not the slightest foundation for these rumors," says F. A. Seiberling, president of the Goodyear Company, "and if I understand the temper of the management, there is not the remotest possibility of the Goodyear being absorbed by any of them, and I am equally certain that there is no thought of its becoming an absorber."

Keeton Will Not Build Fours

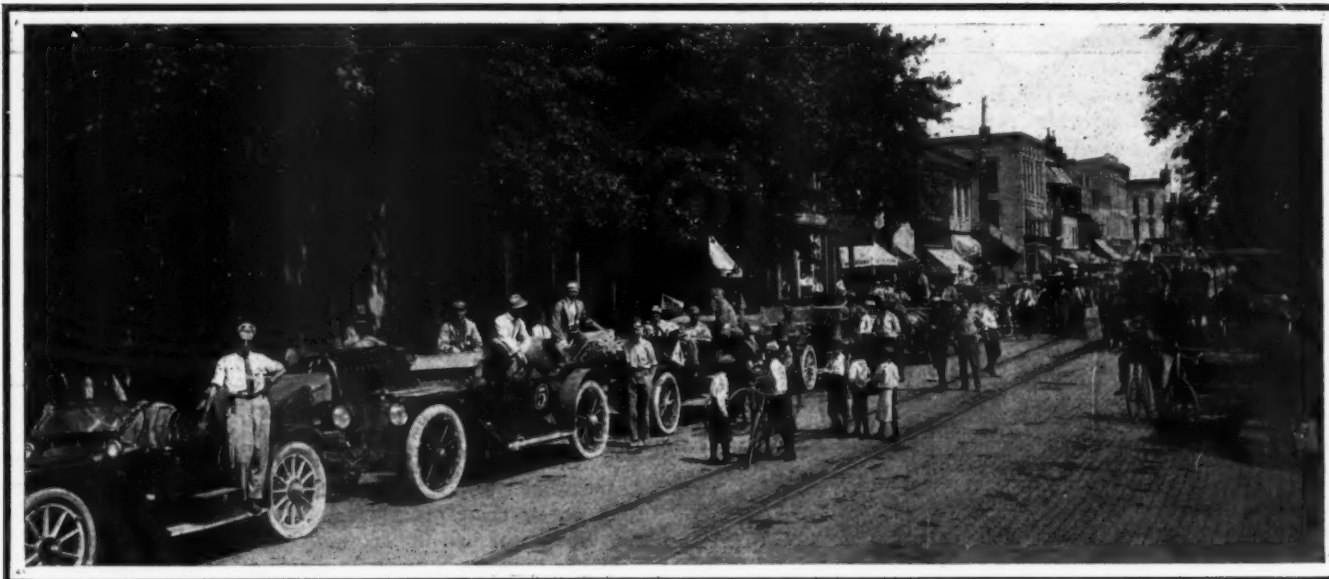
WYANDOTTE, MICH., July 13—The Keeton Motor Company has purchased the plant formerly owned by the Seitz Automobile & Transmission Company, where the manufacture of a six-cylinder car will be begun immediately, the company having abandoned its original intention of making both fours and sixes. The six will have the same construction and body details as already announced, with the exception that the motor will have a stroke of 5 1-2 inches, this being 1-4-inch longer than that originally planned. The bore remains at 3 3-4 inches. The motor will be a special design and will be made for the company by the Wisconsin Motor Manufacturing Company, Milwaukee, Wis., at which plant R. P. Brown, engineer of the Keeton Company, has spent the last 6 weeks in directing the preliminary steps in its manufacture.

Brown Forms New Truck Company

PERU, IND., July 16—The Brown Commercial Car Company has been organized by Will H. Brown, who has interested several prominent local bankers and business men in the enterprise. Mr. Brown has been elected president and Carl H. Wallerich vice-president. The new company will occupy the plant formerly used by the Otis Elevator Company, a finely equipped structure, sufficiently large and up-to-date in every respect.

A light delivery car which has been developed during the past year will be manufactured to sell at about \$1,600.

Will H. Brown is president and general manager of the Mais Motor Car Company, Indianapolis, which makes the Mais truck. He will continue his duties with the latter company, at the same time devoting considerable attention to the new enterprise. Carl H. Wallerich until recently has been manager of the General Industrial & Manufacturing Company, Indianapolis, from which he has resigned to enter the new company.



The Indiana Four-States Tour stopped for a breather at Findlay, Ohio, where the inhabitants turned out in force

Four-States Tour Success

Fifteen Indiana Automobile-Making Concerns Represented—Business Results Already Apparent

Affair Has Been Advertised Ahead and Prospective Buyers Are Rounded Up to Inspect Cars

CANTON, O., July 14—Indiana automobile manufacturers are now on their second annual Four-States Tour. They have crossed the northeastern section of Hoosierdom, have invaded Ohio, and are now preparing to bend southward toward West Virginia. As a fitting climax to a successful first lap of their journey the entire Indiana motoring party this afternoon placed in the imposing mausoleum of William McKinley a beautiful floral set piece as a token of their esteem of one of Ohio's most beloved sons.

It is with the intention of investigating automobile trade conditions and arousing general enthusiasm that this tour is covering nearly 1,300 miles of road in the states of Ohio, West Virginia, Kentucky and Indiana. With twenty-eight cars in the party, including four commercial vehicles, the tourists left Indianapolis on Tuesday morning, July 9, and ran to Fort Wayne, making stops in Kokomo, Peru, Wabash and Huntington. On Wednesday they journeyed to Lima, O., and on Thursday to Tiffin, stopping en route at Findlay, Fostoria and Fremont. To the home of the rubber industry they ran on Friday and this afternoon a short journey brought them to this city.

Tire Town Gave Famous Welcome

Akron will always be famous in the memory of those making this trip. The rubber industry entertained as royally as is its wont and there was one continuous round of festivity from the time the cavalcade reached Barberton on Friday afternoon until it bid goodbye to Akron this afternoon.

Saturday morning was given over to the inspection of seven of the tire factories—Diamond, Firestone, Goodrich, Goodyear, Kelley-Springfield, Motz and Swinehart, the concerns which entertained the Indiana visitors.

Trade conditions along the route are apparently in a splendidly prosperous state. They depend largely upon agricultural

prospects and with the close approach of the actual harvest season automobile dealers are most sanguine of a continuance of the present healthy buying demand. In every town visited the motor car representatives give interesting accounts of the amount of business being done. The low-priced cars are in the lead in numbers; the second-hand problem is not as serious as in the big cities; and the size and trade of the garages indicate the stability of motor car affairs along the 450 miles traversed.

The dealers are looking forward to closing their 1913 contracts and the majority of them expect to continue the lines which they are at present handling. Naturally their interest in the Indiana-made products has been much increased during the last few days.

Northeastern Indiana and the northern tier of Ohio counties cannot boast of pleasant road conditions. To the limit of the Hoosier state hard pikes were covered, but their surfaces were not as even as could be desired. For 3 days the dirt roads of Ohio have had a great cloud of dust raised from their rough and corrugated faces. For a few miles on either side of Akron brick roads have been experienced, and these have been really the only good roads covered by the cars.

Fifteen Companies Represented

Fifteen automobile makers and one of an accessory are participating in this event. They are: American Motors Company, Cole Motor Car Company, De Tamble Motors Company, Great Western Automobile Company, Haynes Automobile Company, Lexington Motor Car Company, McFarlan Motor Car Company, Marion Motor Car Company, Nordyke & Marmon, Maxwell-Briscoe Motor Company, Motor Car Manufacturing Company, Nyberg Auto Works, Premier Motor Manufacturing Company, Service Motor Truck Company, Whitesides Commercial Car Company and the Double Fabric Tire Company of Auburn.

These companies represent the cream of the Indiana producers and they have entered upon this method of showing their latest models with the zest and thoroughness for which they are famous. They have circularized the dealers along the entire route, have used advertising space in the daily newspapers and have posted large lithographic sheets to herald their coming; and have made arrangements which are bringing forth actual results in business for them. They have made the daily runs purposely short and have scheduled stops in all important towns in order to show to the trade and to the public 1913 models.

The American Motors Company has gone to the extent of corresponding with every prospective purchaser within 50 miles of the line of march, inviting them to come to the route. Maxwell dealers along the way and for a large distance on either side have been supplied with Maxwell pennants and information regarding the tour, and Maxwell owners have been seen in great numbers at the crossroads and in the towns.

The personnel of the party is composed mainly of sales and advertising department men. At each stop the former have the opportunity to call on the dealers while the latter generally form a line toward the newspaper offices. The cars themselves include a number of famous and particularly interesting features. The two De Tamble cars are equipped with rotary-valve motors. One of the Haynes cars is the last of the 1912 series, and is the machine which was assembled in less than 2 hours during the convention of Haynes dealers recently. The Maxwell carrying the number 3 is the one which carried the same numeral when it won the 1911 Glidden tour. The Premier Schooner is the same car which made the Overland trip from Atlantic City to Los Angeles last year, and now is acting as an emergency ambulance. The Nyberg truck carries a pipe organ, the Whitesides truck a piano, and the 6-60 Premier and the Pathfinder touring car each have ten-tone Gabriel horns—furnishing ample music for the party.

The Great Western is the confetti car, the pacemaker is drawn for each night, the Marion is the checker's car, the chairman rides in an American and a Lexington carries the secretary's flag. A Nyberg car preceded the tour one week, putting out handbills, posters and distributing advertising matter.

Redwood Falls Sociability Tour

REDWOOD FALLS, MINN., July 16—The second annual sociability tour of the Redwood Falls Automobile Club started in a driving rain at 6 a.m. July 12, with twenty-one cars in line. George Jaehning drove a Cadillac as a pilot car and Rud Stensvad a Cadillac as a pacemaker. There were six Cadillac cars in the tour, three E-M-F cars, four Mitchells, a Cole car, KisselKar, Imperial, Locomobile and a Chalmers.

The first day's run was through southern Minnesota to Waseca for the night control. Short stops were made at New Ulm, Janesville, Waseca, New Richland and Albert Lea. Manakato was the noon stop, where the tourists were addressed by William Jennings Bryan. At each stop automobiles were picked up as escort to the next large city. Gumbo roads and several

side slips resulted in the change of night control 60 miles from Austin. That city became the noon control the second day. The night control at the Hotel Radisson was reached long after dark, and the tourists put up for a rest all day Sunday. The time was spent at the Bloomington Country Club and touring the city. The last day's run was by way of Lake Minnetonka and along the Minneapolis & St. Louis road to Redwood Falls.

Farmers and Ranchmen's Tour

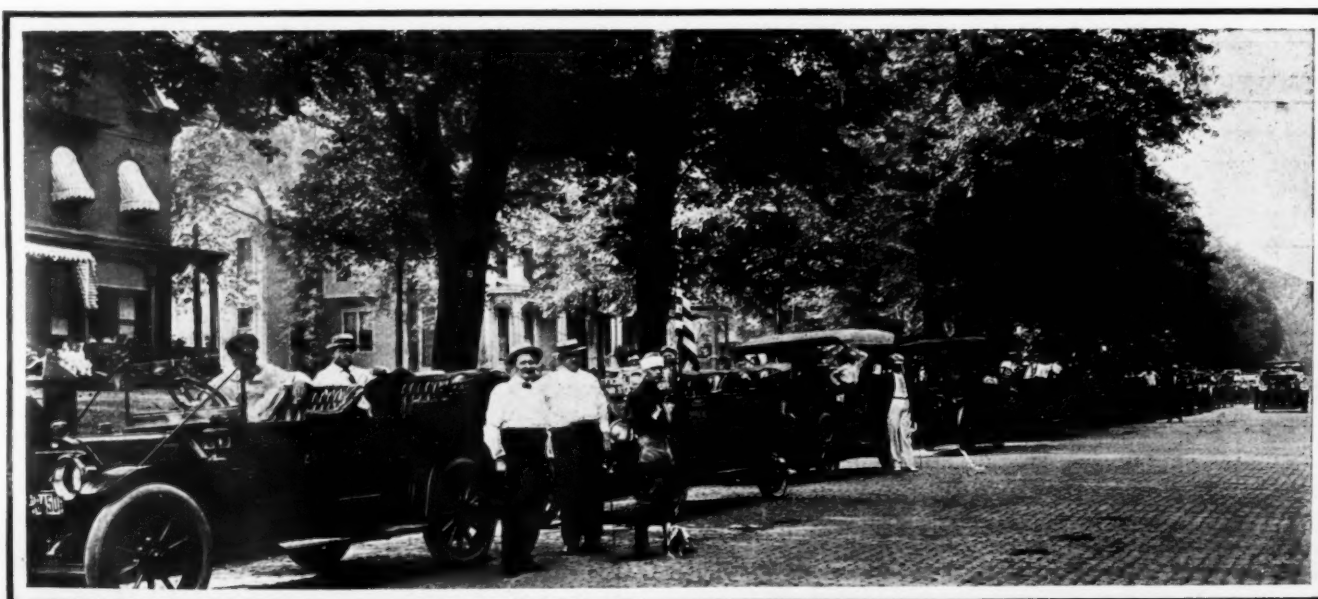
DALLAS, TEX., July 13—Everything possible for the success of the Farmers and Ranchmen's tour from Dallas to San Antonio, July 22-27, has been done. Entries close July 17. Sixty automobiles will leave Dallas on the morning of July 22 and will endeavor to tour to San Antonio and return. Each car must carry four passengers and must be driven by the owner of the car, said owner to be a farmer or a ranchman.

Leaving Dallas the official route is as follows: Lancaster, Red Oak, Italy, Hillsboro, West, Waco (night control), McGregor, Moody, Pendleton, Temple, Holland, Bartlett, Granger, Georgetown, Austin (night control), Buda, Kyle, San Marcos, Godwyn, New Braunfels and San Antonio. Return trip: New Braunfels, San Marcos, Austin, Taylor, Rockdale, Cameron, Ben Arnold, Rosebud, Lott, Marlin, Groesbeck, Doyle, Mexia (night control), Wortham, Richland, Corsicana, Rice, Ennis, Garrett, Palmer, Trumbull, Wilmer and Dallas.

Cleveland Reliability Abandoned

CLEVELAND, O., July 15—Announcement was made late Friday afternoon that the run to be conducted by the Cleveland News would not be held July 15 to 18 as planned. The abandonment of the tour was due to the fact that the event this year would not have the broad character of previous years, and would, therefore, fail to meet the prime purpose of the undertaking. While the entries were exceptionally generous variety of make was lacking, and in that variety lay the chief public interest in the event.

WASHINGTON, D. C., July 14—So successful was the sociability run of the Automobile Club of Washington, held several weeks ago, that the club is planning to promote another contest along the same lines. A different route will be laid out and efforts will be made to secure the entry of more than 100 machines. It is likely President Taft will be asked to set the secret time in which the run will be made.



The Four-Staters halted at Canton, Ohio, in front of the former home of William McKinley, the martyred President

C. A. C. Gets Elgin Meet

Aurora and Illinois Trophy Races Set for August 30—Elgin and Free-for-All to Be Run Off Next Day

Course Already in Fine Shape, and Numerous Entries Promised—Prize List More Than Doubled

CHICAGO, July 13—The annual road races at Elgin, Ill., will be continued after all, the Chicago Automobile Club having taken the place of the Chicago Motor Club as promoter, the alliance with the Elgin Automobile Road Race Association being completed this week. Following the closing of the deal, there was a change in dates, the races being billed for August 30-31 instead of August 23-24, which had been selected by the Chicago Motor Club. This move was made in order to have more time in which to complete the details. The Milwaukee Automobile Club has consented to this change, believing there will be no conflict with the Vanderbilt and Grand Prix.

No attempt will be made to run stock car races as in the past, for it is recognized that it would be almost impossible to get together representative fields. There will be four races as heretofore, but instead of having three races in one day and one the second, there will be two races each day, with the free-for-all the trump card. The complete card is as follows:

FRIDAY, AUGUST 30

AURORA TROPHY RACE.—Open to class C, non-stock, division 3-C, for cars of 231-300 cubic inches piston displacement; distance, 152.5 miles or eighteen laps of the circuit, which is 8 miles 2499 feet in length. Prizes: Aurora trophy and \$700 in cash to the winner; \$200 to second and \$100 to third.

ILLINOIS TROPHY RACE.—Open to class C, non-stock, division 4-C, for cars of 301-450 cubic inches piston displacement; distance, 203 miles 1896 feet or twenty-four laps. Prizes: Illinois trophy and \$700 in cash to the winner; \$200 to second, and \$100 to third.

SATURDAY, AUGUST 31

ELGIN NATIONAL TROPHY RACE.—Open to class E, non-stock, open to class C cars of 600 cubic inches piston displacement and under; made by a factory which has during the 12 months prior to date of the contest produced at least fifty motor cars, not necessarily of the same model; distance, 254 miles, 1050 feet or thirty laps. Prizes: Possession of the Elgin National Trophy for 1 year and \$1000 in cash to the winner; \$300 for second, and \$200 for third.

FREE-FOR-ALL.—Open to any car conforming to the definition of a motor car as defined by the American Automobile Association; distance, 306 miles, 920 feet or thirty-six laps. Prizes: \$1750 in cash to the winner; \$500 to second and \$250 to third.

The entry fee in each case will be \$100 per car, a reduction from the \$300 for first, \$200 for second and \$100 for the third car charged last year. Also the Elgin association has more than doubled last year's prize fund. Whereas in 1910 and 1911 this amounted to \$2,500, this time the association is hanging up \$6,000. It is possible for an Elgin National trophy car to run in the free-for-all at the same time, which is likely to augment the field in the big event.

Entries of Big Drivers Expected

No time has been wasted in getting the entries. Fred J. Wagner has been appointed representative of the club in the East, while in the Western territory the work of securing entries will devolve on F. E. Edwards, chairman of the technical committee of the American Automobile Association, who also is a member of the contest committee of the Chicago Automobile Club. Application for a sanction has been made and it is expected that entry blanks will be out early next week. Entries will close August 24.

Tentative nominations already have been made, pending the issuing of the blanks. Ralph Mulford and Erwin Bergdoll both promised to drive at Elgin, and Mulford volunteered to go after the entries of Teddy Tetzlaff, David Bruce-Brown and Ralph de Palma. It also is thought there will be nomina-

tions made almost immediately by the Mercer, Cino, Stutz and several others with whose makers members of the club's contest committee have been in touch.

It will not require much work to put the course in shape and Elgin has plenty of time in which to smooth out the wrinkles. Had the deal been closed earlier the backstretch would have been widened, but that will have to wait until another year. The citizens of Elgin are more interested than ever, for when it looked as if the races would be abandoned they began to realize what they were losing.

The deal also marks the return to the promotion field of the Chicago Automobile Club, which has held aloof from the sport since the Crown Point road races in 1909, which were handled by the C. A. C.

Columbus to Have 200-Mile Race

COLUMBUS, O., July 15—At a meeting of the Columbus Automobile Club preliminary plans for a 200-mile race on Sunday, August 25, immediately preceding the opening of the centennial, were made. The race will be held at the Columbus Driving Park.

It is the object of the club to duplicate as nearly as possible the event held last year, and efforts will be made to go even farther. Cash prizes and cups will be awarded the winners.

Though it is probable there will be a number of small events, the 200-mile contest for racing cars will be the chief feature. It is expected that many of the best drivers in the United States will be entered in the program. It will be a free-for-all event. A race for stock cars probably will be included in the program.

The racing course, with the additional work which will be put on it, will be in better condition than last year.

Alco Truck Passes Half-Way Point

OMAHA, NEB., July 11—Acting on the suggestion of the Omaha good roads boosters, the crews of the transcontinental truck decided to go through Nebraska by way of Kearney and Julesburg instead of the original route which included Hastings and McCook.

The road boosters of this city thereupon voted to send out an advance guard which will herald the coming of the Alco along the Platte Valley route.

On account of the interest displayed among business men here and the ovation accorded the truck by the Omaha Commercial Club, the crew remained over a day before putting out "for the farther west."

CENTRAL CITY, NEB., July 12—The climax to many enthusiastic demonstrations along the way was reached today when Mayor Wolz, of Fremont, came East to meet the transcontinental Alco truck. With an escort party he piloted the vehicle for 30 miles and then arranged for pilots and courtesies across the State of Nebraska. The truck today negotiated 133 miles, and it would have covered more but for the delays necessitated by the ovations accorded it. The day's run was made with the temperature at 94 degrees. The half-way point across the continent was passed just west of Kearney; distance, 1,773 miles.

Singer Wins Standard Car Race

LONDON, ENG., July 17 (Special Cable to THE AUTOMOBILE)—The standard car race which was run over 100 laps of the Brooklands course under the auspices of the Royal Automobile Club, of Great Britain, was won by Haywood in a Singer car by a margin of 4-5 of a second. This is a remarkable finish as the length of the course was 277 miles and not more than two lengths separated Haywood from Usmar who was second in a Gladiator. The race was for four-cylinder cars the R. A. C. rating of which could not be more than 20.1. The prizes were £100 for the first car to finish the distance. The second and third

prizes were £40 and £10 respectively. Out of fourteen entries there were eight starters, and only three finished. Two Singers, a Vinot, S.C.A.R. and Crespelle retired from the race after starting, while two Stars and a Straker-Squire were disqualified as not being stock cars. Summary:

Car	Driver	Rating	Time h. m. s.	Miles per hour
Singer	Haywood	20.1	4:48:46%	57.49 +
Gladiator	Usmar	15.9	4:48:47%	57.49 +
Turcat-Mery	Engley	20.1	6:18:17	43.88

Vinot ran out its bearings, two Singers broke timing gear chains, while the leading Singer broke an exhaust pipe. Haywood repaired this twice and yet won. Both the winning Singer and the Gladiator went through without tire troubles, although others had numerous punctures and blowouts. The Gladiator made only one stop, that being in the seventy-first lap of the 100-lap race, when the oil supply was replenished.

The specifications required in the race were that the minimum weight of the car should be 2,000 pounds. This was the weight when ready for the race with the driver, mechanic, fuel, oil, water and all tools aboard. The chassis must be of standard touring design all through and must have been shown in the manufacturer's catalogue as such prior to June 25, 1912.

The first stock car race at Brooklands was run last year, the winner being a Star, which averaged 56.24 miles for the 277 miles. That event, however, had a limit of 15.9 on the horsepower and the weight was limited to 1,600 pounds.

Raising Funds for Milwaukee Races

MILWAUKEE, WIS., July 16—The Milwaukee Automobile Dealers' Association, promoter of the Grand Prix, Vanderbilt, Pabst and Wisconsin Challenge road races at Milwaukee on September 17, 20 and 21, is working hard to get together its big fund needed to cover the expense of the reconstruction of Milwaukee county roads, erecting or leasing grand stands and other official stands, and a hundred and one other matters in connection with the running of the big road-racing carnival. While the \$50,000 guaranty fund has already been filled by subscription among the big business men, hotelkeepers and individuals, the association is seeking to play safe and sure by adding about \$25,000 to the amount.

Dallas Planning Brick Speedway

DALLAS, TEX., July 13—Planning an automobile race track that will rival that in Indianapolis and Atlanta, Secretary Ed. Vaughn of the Dallas Automobile Club has gone to St. Louis and other cities to get capital interested in the movement for this city. A corporation chartered for \$200,000 under the laws of Texas is planned to assure the success of the race track. In all probability the course will be built of brick and not asphalt. Already persons in the leading cities of the South have written the Dallas Automobile Club concerning the enterprise and capitalists of Northern cities have evinced a willingness to take part in the enterprise.

Wisconsin Reliability Under Way

BELOIT, WIS., July 15—Fourteen cars entered for the third annual Wisconsin reliability tour for the Sentinel and Emil Schandelin cups. Twelve of the entries are trying for the first cup while the other two are in the private owners division and are after the prize donated by Emil Schandelin. At the end of the first day's run to Beloit from Milwaukee all had finished with perfect scores. The distance is 112.9 miles.

BARABOO, WIS., July 16—All the cars in the Wisconsin reliability tour finished the second day's run, 134 miles, with perfect scores. About half the distance was over recently-built roads of finest quality. The tourists climbed two of the highest ridges in Wisconsin, crossing the Wisconsin river country to Baraboo. Interest in the tour among the farmers is unabated, and the inhabitants of cities and villages along the route are furnishing elaborate entertainment to the tourists.

Cino Features at Portland

Wins the 5-mile Free-for-All and Breaks Record for 300-Cubic-Inch Cars at Same Distance

Tetzlaff in Big Fiat Only 1 Minute Faster—Christie Car Goes Mile in :53

PORTLAND, ORE., July 10—Portland got a taste of thrills and excitement yesterday during the automobile race meet at the Country Club track. Chris Dundee in "Whistling Billy," the famous White car, went over the bank, while records were smashed and sensations were given the 6,500 persons who packed the grandstand, and occupied hundreds of automobiles.

In the big 300-horsepower Christie, Barney Oldfield made the circuit in 53 seconds flat. The races were featured by the consistent and surprising work of the little 30-horsepower Cino racer driven by Fritsch, who landed victory after victory. Fritsch won the 5-mile free-for-all and was awarded the Budweiser cup. He also won several other races and set a new world's record for cars of the 300 cubic inches piston displacement when he drove 5 miles in the fast time of 4:48. In the big car event Teddy Tetzlaff had to drive his best to go 5 miles in 4:47.

The races started with a 5-mile match between Fritsch, driving his Cino wonder, and Lew Heinemann, piloting the Prince Henry Benz. The timing of the Benz went to the bad and Fritsch came on to win easily in 5:21 1-2, the latter loafing after the foreigner went out. The race was later run over, but Fritsch was put out by an accident. The time was 5:03 2-5.

In the second race Teddy Tetzlaff made a runaway of the event. He was pitted against Verbeck in a 120-horsepower Fiat. Tetzlaff drove rings around his teammates and won as he pleased in the fast time of 4:59.

In the contest for the mile track record, the White driven by Dundee did it in 59 seconds and then went again for a second mile in :54 2-5. Teddy Tetzlaff followed in his Fiat and thundered around the mile track faster than the "Whistling Billy." He turned the mile in 54 seconds flat. Then Oldfield made a new record in the big Christie, turning the course in 53 seconds.

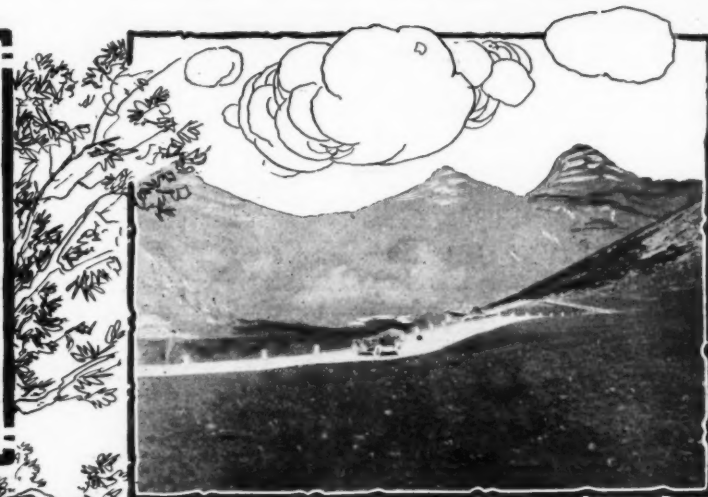
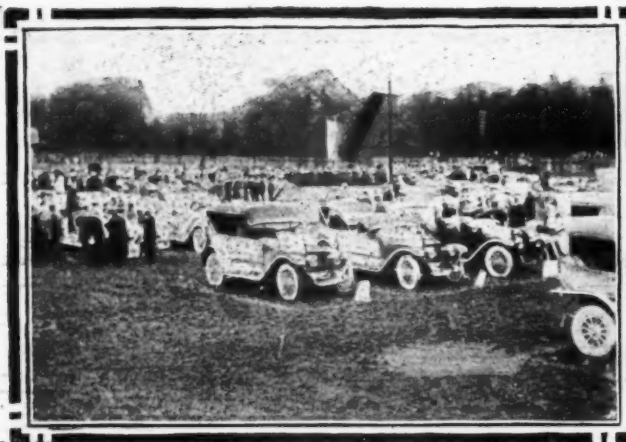
In the last race only Tetzlaff and Fritsch started. Teddy won in the fast time of 4:47, the Cino showing a bad tire.

To Start Metropolitan Speedway

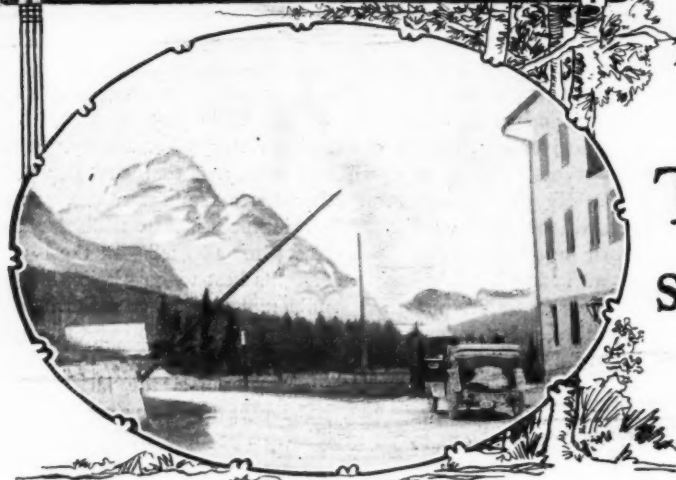
That the period of talk on the proposed speedway on the Jersey meadows is passing and actual work to be commenced seems to be the general opinion of those interested in the proposition. Mr. A. R. Pardington, general manager of the Metropolitan Speedway Association, has made a statement in which he says that "actual work would be started on or before the first of August." It is proposed to have the engineers and workmen who were engaged on the Vanderbilt motor parkway do the work on the new speedway so that the benefit of the 4 years' experience of these operators will be gained.

May Resurrect Fairmount Race

PHILADELPHIA, July 12—In addition to a bill now awaiting action in Councils to the end that the Fairmount Park Commission revoke its action of last spring in abolishing the Fairmount Park road race, a petition addressed to Mayor Blankenburg for renewal of the annual automobile classic is being circulated, largely through the efforts of Harry C. Harbach, former secretary of the Quaker City Motor Club. It is planned to take the responsibility for backing the race out of the hands of the Commissioners and have the municipal authorities stand sponsor, together with local automobile men.



View from top of Talyareggo Pass

Cars at the checking station in Sarbach
Austrian customs house at Centuna

Twenty-four Survive in Strenuous 8-day Test Over Stiffest Eliminates All but Two Dozen of Most Exhausting on Drivers, Being Punctuated by

VIENNA, AUSTRIA, June 24—What is probably without exception the most arduous and searching test to which the present-day automobile could be subjected ended today in Vienna. Eighty-one mud-stained cars, with their occupants weather-beaten and utterly fatigued after their week's toil, rolled up to the club house in the Kamtner Ring during the early evening, and of these no less than twenty-four are shown by the official records to have completed the 1,420 miles without a single stoppage of any kind. This is a wonderful testimony to the endurance and capabilities of the modern automobile, particularly so in view of the fact that when Trieste was reached, 3 days ago, there were only twenty-six cars left in the non-stop list. It was fully expected that half of these would be eliminated by the remainder of the contest, which has embraced some truly awful mountain tracks, and it is a matter of general surprise that only two more cars out of the twenty-six have suffered penalty. With so many victors on hand, the club finds itself in somewhat of a dilemma, for it was always expected that the twelve handsome awards provided by the various Austrian clubs would go round and leave something for the less fortunate competitors. With true eastern feeling the successful drivers have agreed to cast lots for the order of merit, and the difficulty will be solved in this way. As regards the team-prize, the Opel crew takes the first award, for the Minerva-Knight trio, after doing excellently right up to this last day, found their record spoilt through the driver of car 22 missing his gear on the Stubalpe climb.

Of the ninety-five cars entered for the tour (this word is a misnomer, for no rational individual would think of touring over the hilliest part of the Alps at 250 miles per day and without a stop), Austria was represented by forty-one cars; Germany, by thirty-one; Italy presented twelve (all Fiats); France had six; the three Minervas upheld the reputation of Belgium;

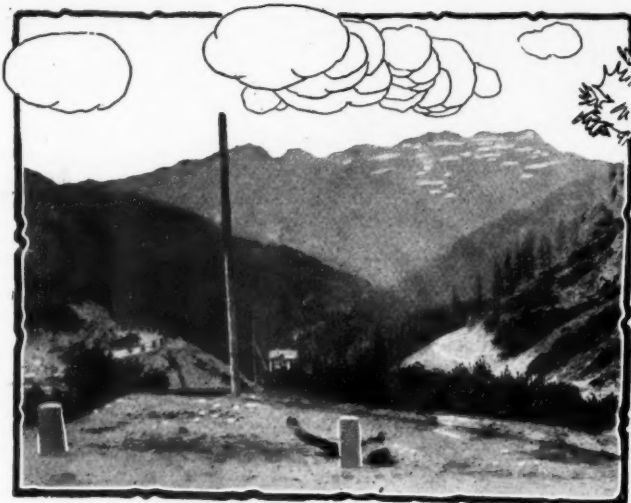
the Rolls-Royce carried the British flag, while the sole representative of the United States was a standard Ford, which, however, failed to materialize at the starting line along with six others. The Rolls-Royce, too, fell out on the first big climb, for it was geared much too high, and it has therefore fallen to the lot of the Daimler press car, on which THE AUTOMOBILE representative was kindly accorded a seat, to uphold the reputation of both countries. With the Union Jack and the Stars and Stripes (the latter as a tribute to C. Y. Knight) flying from the radiator cap, the Daimler did valiant service, and it should really be added to the list of non-stoppers—though, of course, it could not run in the contest on account of the necessity for photographic stoppages.

Severe Work for All the Drivers

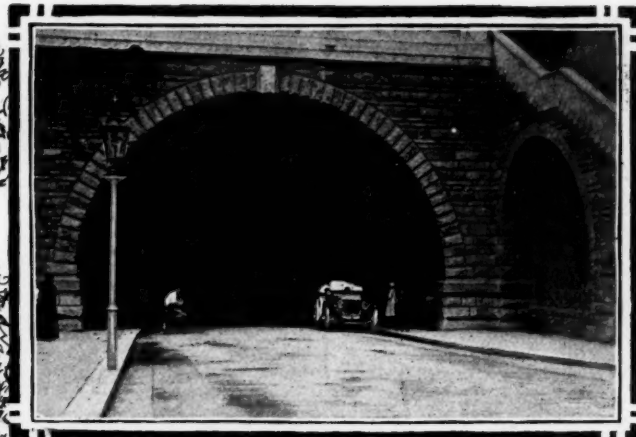
It was the non-stop nature of the work which proved so trying for all the drivers. On these mountain roads—and the committee hunted out all the worst grades they could possibly trace—there is not a 50-yard stretch which does not call for vigilance, and after 250 miles of this game one's brain begins to reel. On three reported instances drivers fell asleep at the wheel—numerous accidents from this cause were only narrowly averted.

The starting hour was 5 each morning; rarely did the bulk of the cars reach the night control till 6 o'clock or later, after a full 12 hours of continuous running. These facts will tend to show how strenuous it has all been and how remarkable it is for the victorious twenty-four to have gone through without a single mark against them.

Many notabilities figured in the contest, and among the eighty-eight starters there were Prince Elias von Parma, the Grand Duke Karl Francis Joseph and the Grand Duke Joseph Ferdinand—the latter a passenger in his own car. The result of this royal patronage—to say nothing of the dozen counts in the running—was that the military element predominated all through.



View from top of Pordoi Pass

Tunnel at Severst connecting two parts of city
Hairpin turn and tunnel in Talyareggo Pass

Austrian Alpine Tour

**Grades to Be Found in the Alps Passes
the Eighty-one Starters—Contest
All the Mountain Highways
Many Hairpin Turns**

Most of the official observers were army men, and at each village and town on the route soldiers guarded the corners and lined the streets in most solicitous fashion. Another attraction was the one and only lady driver, Miss Helene Morariu, who bravely drove right through with much skill and pluck.

The cars varied in power from the big Mercedes of 70 horsepower to the little Bugatti of but 12 horsepower. On the average about 20 horsepower was most popular. All the cars had to be open four-seaters and all without exception were low-geared on account of the exceptional severity of the mountain tracks—25 per cent. grades being quite common.

But it is very important that the reader should have a clear idea of motoring conditions in Austria, and particularly in the Tyrolean Alps. No one in the world has a better idea of the correct way to make motor roads than the Austrian government engineers, and the chief mountain passes are truly wonderful achievements. When it is said that our Daimler-Knight on two occasions—the Broccone and the Monte Mauria Passes—climbed up above the 5,000 foot level without dropping below third gear it will be appreciated that much skill has been expended in winding the road along the mountain side, with plentiful use of hairpin corners to ease the grade. Regarding these hairpins, there are no less than twenty-eight on the ascent of the Pordoi Pass, while the classical example of the Stelvio, where the road rises to a height of over 9,000 feet, has forty-six hairpin corners on the Austrian side and nearly as many on the descent into Italy.

Picturesque Features of Tour

The roads in the Tyrol are magnificent—their surface is, in general, quite up to the level of their easiness of grade. As a touring district the country is in every way to be preferred to Switzerland, which should be boycotted by every motorist on account of the existence of the interminable anti-automobile laws and regulations. In regard to scenery, too, the

Tyrolean Alps are second to none; the beautiful white Dolomites create a lasting impression on the mind, and the view of these high and rugged peaks from the Broccone Pass is one never to be forgotten. Let the reader of these lines who purposes running his car in Europe start off from Trieste (whither his car can conveniently be shipped) and follow the itinerary of this Austrian Alpine tour. The results will without doubt provide a most enjoyable remembrance of a delightful tour.

To deal in brief with the details of the contest, it was on Sunday, June 16, that the cars were despatched from Vienna at 5 a. m. on their 250-mile run to Spittal. German drivers are proverbial speed-merchants, and till the mountain country was reached, some 50 miles south, the pace was up to the limit of each car's capabilities. But let it be said that there is a great deal more bark than bite about these pointed-nose, wind-cutting touring cars; they race past you at 50 miles an hour, with deafening exhaust, scattering the stones and raising the dust in high clouds. As soon as a hill is reached, however, back they come, and at the summit one has the pleasant satisfaction of knowing that they are toiling slowly up, some miles in the rear.

The Semmering, once the scene of historic climbing events, was the first of the passes, but the modern car has advanced to such levels that this 4,000-foot ascent was hardly enough to slacken progress. On this first day's run the severe climbing was not encountered till 200 miles had been traversed; then, however, there was enough to satisfy the most ambitious. An old Roman road had been unearthed at Tauern, and so steep was it that six cars failed utterly, including the big Rolls-Royce, while seven or eight more suffered delays and had to pay penalty marks. Ten miles farther on came the Katschberg—a grade of something worse than 25 per cent. and with a fearful surface. All the cars which had toiled up the Tauern managed to crawl up this climb, but the boiling radiators told their own tale of



The Grif & Stift car spinning around the curves of the road through the Monte Maggiore Pass

laboring engines. Thus was Spittal reached with over twenty cars out of the non-stop running.

On Monday the objective was Trento—in an Austrian district where Italian speech and customs still survive. On this run came the Bruneck (4,200 feet), Jauffen (5,500 feet) and Mendel Passes (the latter rising to 4,500 feet), and the competitors had enough and to spare of hairpin bends and hill-climbing work before the day was over. Fortunately, the roads are wonderfully good as regards surface and little or no tire trouble was experienced—in pleasant contrast to the opening day's journey, on which the rough going played havoc with the casings.

Then followed the wonderful Dolomiterstrasse—a magnificent highway constructed by the Austrian Government after 16 years of work, at a cost of over 4,000,000 kronen (\$800,000). No less than five times does the road rise to a height of above 5,000 feet; on the Pordoi the 7,000 feet level is passed, and on the Falzarego this is only missed by some 30 feet. All along the road magnificent panoramas of mountain peaks and valleys open themselves out, and it may be said, without fear of contradiction, that this run across the Dolomites is the finest day's journey available in the whole of Europe. For the average driver of the average car there is not a single danger point on the run; care has, of course, to be exercised when descending these mountains by reason of the hairpin bends, which can only be rounded at a slow pace. Otherwise, the car can be allowed to coast down at a good speed, with the comforting knowledge that nowhere on the descent will the grade become steeper than 8 per cent.

Three Fatalities During Tour

After the fourth day's run to Trieste, on the Adriatic, the route ran to the borders of Bosnia, and it was here, on the Monte Maggiore Pass, that the only fatal accident took place. It was the old story of taking risks; a front spring was cracked through, but the driver refused to stop and be penalized. At the first bend of the descent the driver lost control of the car, the result being that three of its passengers were killed. This car was No. 5, driven by Fischer, and an extraordinary coincidence has to be related in that another driver named Fischer passing this place soon afterwards fell asleep

at the wheel and ran his car into the side of the road. Fortunately no serious damage was done.

No other accidents occurred to mar the event, and, as was stated before, despite the exceptional severity of the side roads traversed on the last 2 day's route, no cars fell out of the running and the twenty-four drivers who arrived at Vienna this evening can congratulate themselves on having emerged triumphantly from the most strenuous trial in automobile history.

Canada Holding Up Tourists

MONTREAL, CAN., July 13—The following notice as to customs regulations is being sent to members of the Automobile Club of Canada by the secretary and is of prime importance in view of the recent holding up of the cars of two Montreal motorists at the border:

"We beg to draw your attention to the importance of strictly observing the customs regulations when crossing the international boundary between Canada and the United States. Motorists are required to stop and report at the frontier port in all cases and not at some interior port. The American customs department is now rigidly enforcing this regulation, and the Canadian customs likewise. It is necessary for motorists to report at the Canadian frontier port when leaving Canada, and at the first frontier port when entering the States; on the return journey the same formalities must be carried out.

"In cases where the tourist intends stopping from 1 to 3 days only in the States, the officer may use his discretion and waive the requirement of a bond, but for a longer period, not exceeding 6 months, a bond is required, and may be secured at most of the frontier offices, while you wait, at a reasonable fee. For your information we give hereunder the frontier ports of the principal routes in this section of the province, where motorists are required to stop:

Canada.

Lacolle Junction.
Noyan Junction.
Abercorn.
Mansonville.
Dundee.
Hemmingford.
St. Armand.
Rock Island.
Coaticook.
Comin's Mills (to July 1st).
Hall's Stream (after July 1st).

United States.

Rouses Point, N. Y.
Alburgh, Vt.
Richford, Vt.
North Troy, Vt.
Newport, Vt.
Ft. Covington, N. Y.
Moore's Junction, N. Y.
St. Alban's, Vt.
Derby Line, Vt.
Island Pond, Vt.
Beckers Falls, Vt.

Elements That Affect Truck Tire Guarantees

Too Much Speed and Overloading Must Be Considered, as Well as Proper Distribution of Load

Local Conditions, Such as Hilly Streets and Poor Paving Should Also Be Taken Into Account

WHY is it when solid-tire makers guarantee mileage delivered by their product from 8,000 to 10,000, and where certain large users can get an average of 1,000 miles more than the extreme guaranteed figure, that one of the chief complaints heard about truck operation is that some of the users of that form of transportation fail to get the guaranteed figures from their tires?

Why is it that in regular service one company can get over 30,000 miles from an exceptional tire and as low as 2,500 miles from another?

The answer lies in the difference in service conditions.

Standard brands are not very unlike, one from the other, differing only in some of the structural details. The fact that the guarantees under which they are sold are similar, speaks clearly on that point.

The exact fact is that the standard tires must be good for the guaranteed mileage or the guarantees would bankrupt the makers. Guarantees are not made on wild claims, but are based upon long experience and careful compilation of data covering years of service.

As to Maker's Tire Guarantees

The truck-using public is still uncertain as to the significance of tire guarantees. As a matter of common practice, the user is told that the tires he purchases are guaranteed by their makers for 8,000 or 10,000 miles under certain conditions. If he can get more than the guaranteed mileage, he is that much winner; if he falls below, he can obtain an adjustment from the tire company that made the goods.

On the face of it, it would seem that tire costs ought to be one of the least troublesome items in truck operation, but the contrary is the truth.

The difficulty lies in the fact that there are numerous obstacles in operating trucks that make for short life of tires. These may be grouped in a general way as follows:

- Character of road surface.
- Excessive grades.
- Overloading.
- Overspeeding.
- Bad distribution of loads.

The first four elements may be passed over briefly, as they are generally recognized by truck users and will only be considered with relation to their bearing upon the last factor in tire abuse.

It is quite apparent that if a road surface is sufficiently rough that tires will suffer no matter how moderate the loading or speeding may be. An excessive grade will impose an unwarranted strain upon tire equipment without reference to any other factor.

Overloading the tires will break them

down and cause short mileage, and overspeeding will result in burnt-out tires under the inexorable rule of V^2 .

The two latter subjects are taken into consideration by the tire makers in framing their tabular guarantees, and the first two are so thoroughly recognized that there is no further need of discussing them.

But with regard to poor distribution of the load, the users of automobile trucks are just beginning to recognize its importance as a factor in reduced tire mileages. Some of the makers and sellers are not quite clear on the point, although numerous claims for adjustments for as much as 3,000 miles per tire have been presented to several of them.

A recent case presented to the B. F. Goodrich Company for adjustment gives an excellent idea of the principle involved. In the case in point, a Pierce-Arrow 5-ton truck used for hauling metal and equipped with adequate tires and run within the speed and load limits of the guarantee, failed to deliver the mileage. The dual rear tires wore out about 2,500 miles short of the guaranteed figure and an adjustment was demanded by the user. It was shown that while in this particular model of car and the special body used, 90 per cent. of the load should have been carried by the rear wheels, that in practice, the owner of the truck placed 98 per cent. of the load over the rear axle and upon the extension back of the axle. The road surfaces were poor and some heavy grades had to be surmounted and the tires gave way.

Excessive Weight on Tires

The speed rate was well within the limit, and as the actual maximum load carried was just the rated amount for the tire equipment, the user could not understand why the tires failed to stand up until it was explained to him that the continuous use of the truck with 8 per cent. excessive weight on the rear tires was sufficient to account for their failure.

In this case the rated load was 10,000 pounds, of which 9,000 pounds should have been carried on the rear axle. But the convenience of loading and unloading caused the user to place the whole load upon or so near to the bearing point upon the rear axle that tests showed it carried 9,800 pounds, exclusive of the empty weight, and the extra 800 pounds did the business for the tires in steady service.

Another case, illustrative of a different phase of bad loading, was that of a Peerless 3-ton truck equipped with sufficient tires for its rated load. The car was designed to carry 77.5 per cent. of its total loaded weight on the rear axle and in practice the user

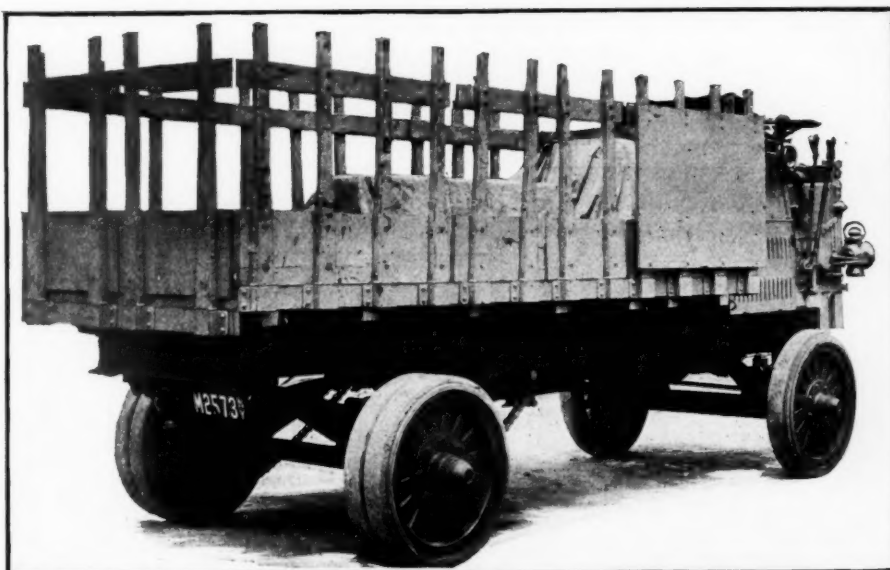


Fig. 1.—In cars of the motor-under-the-seat type, such as this 5-ton General Motors Company truck, the life of tires depends in a measure upon an even distribution of the load. The heavy front tires are designed to carry 40 per cent, and in this illustration a 4-ton casting and a barrel of white lead are correctly placed



Fig. 2—Velle 2-ton truck, a type of the motor-in-front style of construction which allows 3-4 of the total weight to be carried on the rear axle. With such light bulky freight as furniture the best practice is to put the heavier articles to the front of the center of gravity

kept well within the limit of load and speed except for 1 day's service, when it was necessary to move a load of steel castings in addition to its ordinary and usual load of light, bulky merchandise. The total load carried that day on a run of 22 miles was exactly the rated load of the truck, but the castings were placed amidships with the result that the front tires carried 48 per cent. of the load of freight. Two weeks later in ordinary service, both front tires pegged out.

The tires had been in service for 7,000 miles and up to the time of the single instance of misuse, appeared to be good for at least 5,000 miles more. A careful inspection of the ruined tires showed that the structure of the rubber had been changed and that it had lost a large measure of its original resiliency where it had not been disintegrated.

The two cases cited show the effect of constant overloading of one set of wheels and of a single case of overloading. In both cases the results attained are similar—the destruction of the tires.

Various Forms of Guarantee

The manufacturers of truck tires, such as the Goodyear and United States Tire Company, guarantee 10,000 miles conditioned upon moderate speed and rated load. Other companies place their guaranteed figures at 8,000 miles. Among these concerns are Goodrich, Diamond, Swinehart and various others. The Firestone company's guarantee is framed on slightly

different lines, but long experience has shown that it is equal to about 8,000 miles.

The Firestone guarantee is as follows:

"When subjected to no greater loads, and run at no greater speeds than specified in our schedule, we guarantee Firestone Motor Truck Tires as follows:

"12 months on cars not exceeding 25 miles daily service.

"10 months on cars not exceeding 25 to 35 miles daily service.

"7 months on cars not exceeding 35 to 50 miles daily service.

"4 months on cars not exceeding 50 to 75 miles daily service.

"3 months on cars not exceeding 75 to 100 miles daily service."

The load limit per wheel upon which the B. F. Goodrich Company bases its guarantees is set forth in the tabulations below covering both the single and dual types of tires.

Practically all solid tires are now made in conformance with the specifications of wheel sizes and dimensions laid down by the S. A. E., thus simplifying the problem of the manufacturer as to

GENERAL DIMENSIONS—SINGLE TYPE

Carrying Capacity for Wheel	Width of Tire	Height of Tire	Thickness Steel Tire Rim	Width Steel Tire Rim	Width Wood Felloe and Band	Diameter Wheel	Nominal Size of Tire
	A	B	C	D	E	F	
950	3"	2 1/2"	1"	4"	2 1/2"	26"	32x3"
						28"	34x3"
						30"	36x3"
						32"	38x3"
						34"	40x3"
						36"	42x3"
						38"	44x3"
1375	3 1/2"	2 1/2"	1 1/8"	4 1/2"	2 1/2"	40"	46x3"
						42"	48x3"
						26"	32x3 1/2"
						28"	34x3 1/2"
						30"	36x3 1/2"
						32"	38x3 1/2"
						34"	40x3 1/2"
1750	4"	2 1/2"	1 1/8"	5"	3 1/2"	36"	42x3 1/2"
						38"	44x3 1/2"
						40"	46x3 1/2"
						42"	48x3 1/2"
						26"	32x4"
						28"	34x4"
						30"	36x4"
2000	5"	2 1/2"	1 1/8"	6"	4 1/2"	32"	38x4"
						34"	40x4"
						36"	42x4"
						38"	44x4"
						40"	46x4"
						42"	48x4"
						28"	34x5"
3000	6"	2 1/2"	1"	7"	5 1/2"	30"	36x5"
						32"	38x5"
						34"	40x5"
						36"	42x5"
						38"	44x5"
						40"	46x5"
						42"	48x5"
4000	7"	2 1/2"	1 1/8"	8"	6 1/2"	30"	36x6"
						32"	38x6"
						34"	40x6"
						36"	42x6"
						38"	44x6"
						40"	46x6"
						42"	48x6"

MAXIMUM LOAD TO BE CARRIED BY FIRESTONE SOLID MOTOR TRUCK TIRES PER WHEEL

Size	32"	34"	36"	38"	40"	42"	Speed M.P.H.
Single	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	
2"	450	475	500	525	550	575	20
2 1/2"	670	710	750	790	830	870	20
3"	900	950	1000	1050	1100	1150	20
3 1/2"	1130	1190	1250	1310	1370	1430	18
4"	1350	1425	1500	1575	1650	1725	16
5"	1800	1900	2000	2100	2200	2300	14
6"	2250	2375	2500	2625	2750	2875	12
7"	2700	2850	3000	3150	3300	3450	10
Dual	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	
2"	1125	1188	1250	1312	1375	1438	18
2 1/2"	1675	1775	1875	1975	2075	2175	18
3"	2250	2375	2500	2625	2750	2875	16
3 1/2"	2825	2975	3125	3275	3425	3575	14
4"	3375	3560	3750	3940	4125	4310	13
5"	4500	4750	5000	5250	5500	5750	12
6"	5625	5940	6250	6565	6875	7190	10
7"	6750	7125	7500	7875	8250	8625	10

odd-sizes and allowing him to center attention on the standard sizes.

Analyzing the guarantee of any of the standard companies shows that the wheel-load is taken as the unit. Time was when the guarantee covered a certain minimum number of miles at a certain maximum carried load, but the modern practice is to regard each wheel as a separate problem. So far, the shifting of the load from one side to the other so that extra stress has to be borne by one wheel, either front or rear, has not been considered in a definite way, but emphasis is laid in 1912 on the fact that each set of wheels must be adequately tired in order to enjoy the guarantee of the manufacturers.

An excellent way to determine what tire equipment to use on a certain track is to load it as heavily as it is ever likely to be loaded in service and then weigh the front end and the rear end of the loaded car. Suppose that the truck in question is rated at 3 tons carrying capacity, entirely disregarding the factor of overload allowed under the guarantee furnished by its manufacturer.



Fig. 3—Packard 3-ton truck with full load of pianos. Note that the middle pair stand only a trifle in front of the rear axle and that the end pair and forward pair balance each other in such a way as to throw almost 90 per cent. of the load weight on the rear wheels

Suppose that the load placed upon the truck weighs 6,000 pounds and the car with its body, driver and supplies weighs, say, 7,200 pounds, or a total of 13,200 pounds.

The car will probably fall within one of three classes of design. It may be propelled by a gasoline motor located in front under the hood, the driver sitting behind the motor; or it may be driven by a motor placed back under the driver's seat; or, again, it may be an electric with the batteries swung under the platform and bearing about equally upon all four wheels. If in the first general class the percentage of load to be carried on the rear wheels, including chassis and body weight, runs as high as 92 per cent. In such well-known makes in the 3-ton size as Grabowsky, the percentage of weight carried by the rear wheels is 60; Packard, 72; Peerless, 77.5; Velie, 75.

In the second class cited, the following examples show the general idea: Sampson, 66; Garford, 60; Hewitt, 60; Mack, 62.

Load Divided Between Axles

In the electrics of the 3-ton size the load is well divided between the axles, the proportion being about 45 to 55. Of course, in all the cases used for illustration the type of body makes all the difference in the world about the ratio of load to be carried by each set of wheels. If a short body is used the tendency would be to lessen the percentage of weight carried by the rear wheels. If a long overhang is the type selected, the rear wheels must carry a higher percentage of the load than is indicated by the figures.

Suppose that the car in question is a Velie, which in the regular type is supposed to carry 75 per cent. of its total load on the rear axle. If the figures of the weighmaster show that the front end of the loaded car weighs 3,300 and the rear end 9,900 the user should divide each number by 2 to give the weight-rate for each wheel. Then by turning to the tabulation of tire sizes in relation to loads it is a simple matter to pick out the size recommended to carry a shade more weight than is shown by the division.

In this case the rated weight for the front wheels would be 1,650 pounds, which calls for a single type of front tire not less than 4 inches wide. This model is equipped with dual rear wheels and the weight to be carried will be found to be 4,950 pounds per wheel. Dual rear tires at least 4 inches wide are recommended by the manufacturer; in fact, 5-inch tires are supplied as stock equipment.

If a Packard, equipped with a long overhang and designed to carry more of the freight on the rear axle than the foregoing example, should be used, and the weight on the rear wheels should reach 6,000 pounds per wheel, dual tires of at least 5 inches in width would be indicated.

GENERAL DIMENSIONS—DUAL TYPE

Carrying Capacity for Wheel	Width of Tire	Height of Tire	Thickness Steel Tire Rim	Width Steel Tire Rim	Width Wood Felloe and Band	Diameter Wheel	Nominal Size of Tire
	A ₂	B ₂	C ₂	D ₂	E ₂	F ₂	
2500	6"	21"	1"	7"	6"	26" 28" 30" 32" 34" 36" 38" 40" 42"	32x3" 34x3" 36x3" 38x3" 40x3" 42x3" 44x3" 46x3" 48x3"
3500	7"	21"	1"	8"	7"	26" 28" 30" 32" 34" 36" 38" 40" 42"	32x3½" 34x3½" 36x3½" 38x3½" 40x3½" 42x3½" 44x3½" 46x3½" 48x3½"
5000	8"	21"	1"	9"	8"	26" 28" 30" 32" 34" 36" 38" 40" 42"	32x4" 34x4" 36x4" 38x4" 40x4" 42x4" 44x4" 46x4" 48x4"
6000	10"	21"	1"	11"	10"	28" 30" 32" 34" 36" 38" 40" 42"	34x5" 36x5" 38x5" 40x5" 42x5" 44x5" 46x5" 48x5"
8000	12"	21"	1"	13"	12"	30" 32" 34" 36" 38" 40" 42"	36x6" 38x6" 40x6" 42x6" 44x6" 46x6" 48x6"
10000	14"	21"	1"	15"	14"	30" 32" 34" 36" 38" 40" 42"	36x7" 38x7" 40x7" 42x7" 44x7" 46x7" 48x7"

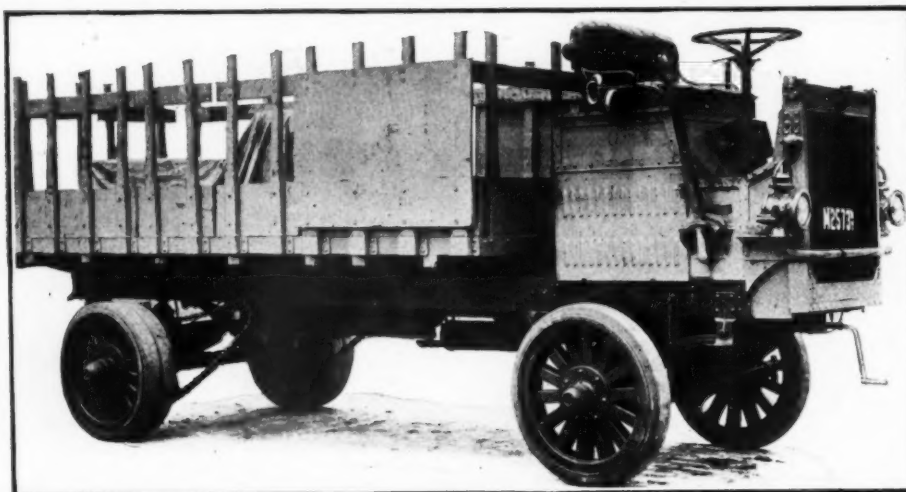


Fig. 4—In this picture of the General Motors Company 5-ton truck the casting, weighing 4 tons, and the barrel of white lead are placed too far aft, and if carried in those positions would make short work of the best tires. Loading, in the final analysis, must depend largely on the intelligence of the driver, because each trip presents its own problem

The tire makers say that the solution of the problem requires individual treatment. They say that no matter what type of car, body and capacity is considered, the simple expedient of

the tires, why that is a different story again, as Mr. Glass says.

There is no margin of safety in the tires. They have no overload capacity.

They are built to carry a certain maximum load at a certain maximum speed and until it is possible to give rubber composition an overload capacity the result of overloading will always be less mileage and tire life.

Of course, there is one way to accomplish such a result. If the user finds that the maximum load to be carried by the tires calls for 4-inch singles in front and 5-inch duals behind, he may put on 5-inch singles in front and 7-inch duals behind and go clear to the limit of load-tolerance allowed by the manufacturer without losing the benefits of his guarantee on car or tires.

This plan is not economic in its principles and does not work out satisfactorily as a theory, but it surely works splendidly in actual practice. Take one of the largest express companies in the country, for example. The engineers of this company soon after the introduction of the automobile learned that under-tiring was an expensive proposition. Many trucks were operated early in the history of the industry and the battery has been tremendously increased with each step toward improvement in construction. Nearly 7 years ago the conclusion was reached that larger tires would add to tire mileages and the result is to be seen in the average of 11,182 miles per tire, which is the amount delivered by those in service of this company.

Express Work a Severe Test

Express service is a severe test of truck efficiency and the equalization of loads to tire equipment is a difficult problem for such companies. This is due to the character of much of the service required where deliveries are made at short intervals, or where loads are picked up along regular routes. In the freight service between depots and warehouses or distributing stations the matter can be given more care. Part of the satisfactory showing made by the tires of this company's automobile service is undoubtedly due to the careful adjustment of the loads to the tire equipment per wheel.

For the purpose of illustrating another factor in the problem of tire life in connection with proper loading, the street conditions in various American cities are interesting, particularly with reference to the mileages delivered. New York has a total of 2,707 miles of paved streets involving every grade and type of pavement known to mankind and averaging from poor to fair. The cobble pavements and sharp-edged stone blocks are destructive to truck tires in New York as may be seen from the fact that fragmentary data indicate an average of only 6,161 miles per tire used on all classes of commercial vehicles excepting omnibuses in the metropolis.

The United States Tire Company bases its guarantees and recommendations as to loading on the following tabulation:

Single Tires						Dual Tires					
Width of Tire	Height of Tire	Overall Width	Flange Width	Carrying Capacity	Nominal Tire Size	Width of Tire	Height of Tire	Overall Width	Flange Width	Center Wedge	Carrying Capacity
A	B	D	No.	Lbs.		A-n	B-2	D-2	No.	No.	Lbs.
2½	2 1/8	3 1/8	1	650	30x2 1/2 32x2 1/2 34x2 1/2 36x2 1/2 38x2 1/2 40x2 1/2 42x2 1/2	5 1/2	2 1/8	6 1/8	1	3	1400
3	2 1/2	3 1/2	1	950	30x3 32x3 34x3 36x3 38x3 40x3 42x3	6 1/2	2 1/2	7 1/8	1	3	2500
3 1/2	2 3/4	4 1/4	2	1375	30x3 1/2 32x3 1/2 34x3 1/2 36x3 1/2 38x3 1/2 40x3 1/2 42x3 1/2	7 1/4	2 3/4	8 1/4	2	4	3500
4	2 7/8	5	2	1750	30x4 32x4 34x4 36x4 38x4 40x4 42x4	8 1/4	2 7/8	9 1/4	2	4	5000
5	2 7/8	6	2	2000	34x5 36x5 38x5 40x5 42x5	10 1/4	2 7/8	11 1/4	2	4	6000
6	2 7/8	7	2	3000	36x6 38x6 40x6 42x6	12 1/4	2 7/8	13 1/4	2	4	8000
7	2 7/8	8	2	4000	36x7 38x7 40x7 42x7	14 1/4	2 7/8	15 1/4	2	4	10000

THE SOCIETY OF AUTOMOBILE ENGINEERS IN AIDING THE STANDARDIZATION OF PRACTICE WITH REGARD TO WHEEL DIMENSIONS HAS ADOPTED THE FOLLOWING STANDARDS:

S. A. E. WHEEL DIMENSIONS FOR SOLID TIRES
NON-DEMOUNTABLE AND DEMOUNTABLE EQUIPMENT

All Dimensions in Inches Single Tires												
Sectional size of tire.....	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½
Width of felloe and band.....	1½	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½	6½
Thickness of steel band.....	1½	1½	1½	1½	1½	1½	2	2	2	2	2	2
Minimum thickness of felloe.....	1½	1½	1½	1½	1½	1½	2	2	2	2	2	2

Dual Tires												
Sectional size of tire.....	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½
Width of felloe and band.....	4	5	6	7	8	9	10	11	12	13	14	15
Thickness of steel band.....	1½	1½	1½	1½	1½	1½	2	2	2	2	2	2
Minimum thickness of felloe.....	1½	1½	1½	1½	1½	1½	2	2	2	2	2	2

Wheel Diameter Over Steel Band Single and Dual Tires							
Nominal outside diameter of tire.....	30	32	34	36	38	40	42
Wheel diameter over steel band.....	24	26	28	30	32	34	36
Exact wheel circumference over steel band. No shrinkage allowed.....	75½	81½	87½	94½	100½	106½	113½
Tolerance over exact circumference of bands before application to wheel.....	75½	81½	88½	94½	100½	106½	113½
Tolerance over exact circumference of bands after application to wheel.....	75½	81½	88½	94½	100½	106½	113½

Bolt Equipment for Side Flanges Bolt Hole Circle All Bolts to be ½" Diameter							
Outside diameter of tire.....	26	28	30	32	34	36	38
Diameter bolt hole circle.....	18½	20½	22½	24½	26½	28½	30½
Number of bolts.....	6 or	9 or	18	8 or	12 or	24	10 or

A very large percentage of this astonishing showing is undoubtedly due to habitual overloading and overspeeding, but the lack of intelligent loading so that the weight carried on each wheel corresponds with the capacity of the tire unquestionably has some effect.

Baltimore Is Hardest on Tires

The extraordinary mileage achieved with tires used on bus lines raises the average to 8,274. These figures appear to be out of proportion, but it should be taken into consideration that all of the 8,000 commercial cars owned in New York were not reported and that all the buses were reported. Another angle may be viewed when it is understood that the buses travel only the best streets.

Baltimore, with its vicious pavements and lack of them, has the worst record in the United States, although Pittsburgh with its hills, Seattle located on the slope of the Cascade Mountains and San Francisco with its fierce grades, are not far behind. In Kansas City, where the hills are insurmountable for the average truck, the record is better, reaching 8,000 miles per tire, or approximately the guaranteed figures. In Baltimore the mileage average is 4,024. The difference is due solely to the variation in street conditions, as Baltimore grades are as flat as a spirit level compared with those of Kansas City.

In Chicago, which is as flat as a board, but where paving conditions are not quite perfect, the average mileage delivered per tire is 8,115. In St. Louis, which has more hills but better surfaces, the mileage is 9,793. Washington, with its fine streets and level general surface, is reported as giving 15,000 miles per tire, but the figures are based upon insufficient data as com-

pared with the large use of the truck in the capital. Another factor in the Washington situation is that electricians of 1 and 2-ton capacity are largely used with oversize tires. Still another is the sharp application of the speed laws.

The highest percentage of asphalt streets, or equivalent pavement, is found in Kansas City, where the proportion is 64 per cent. Washington has less than 50 per cent., Baltimore only 9.28 per cent. and Boston 4.3 per cent. The deduction to be drawn from the figures is that where there is a good road surface the tires last disproportionately longer than that factor would seem to justify, despite heavy grades and fast service. Where there are good roads and streets and few grades the increase in mileage is astonishing. The ideal condition will be found where smooth, traction-giving roads, level grades and

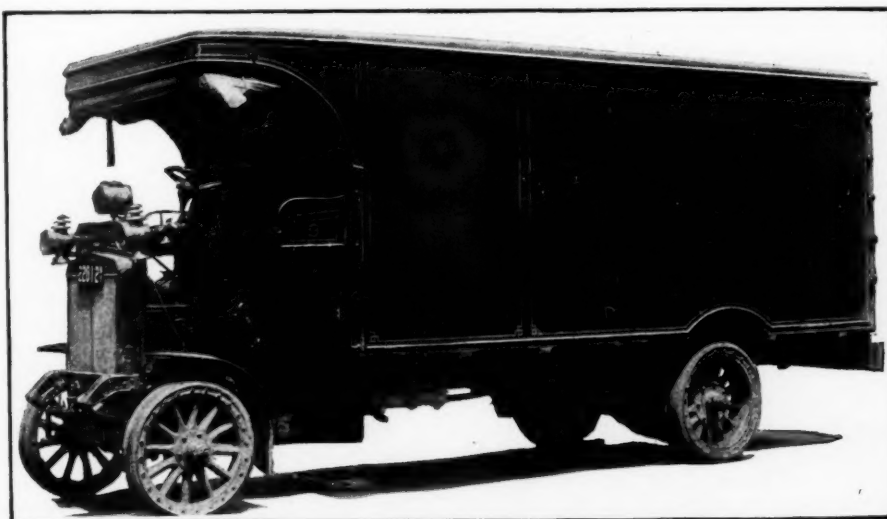


Fig. 5—Sampson 3-ton truck equipped with a very heavy van body. The chassis structure of the Sampson lends itself to this type of service, and in this particular wagon the weight is so evenly distributed that loading of furniture makes little difference in tire wear.

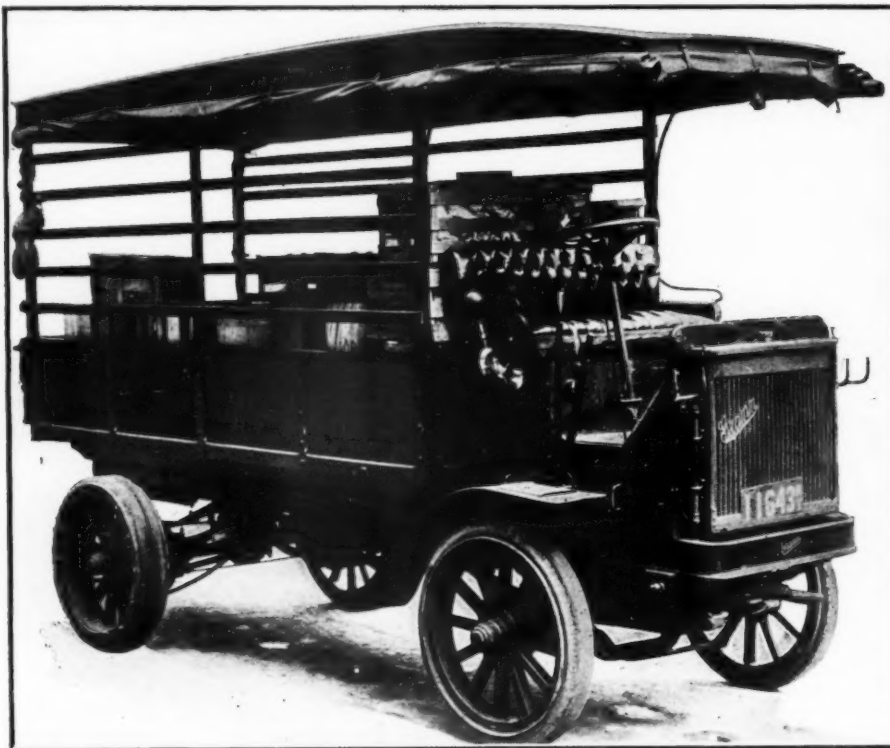


Fig. 6—Gramm truck which ordinarily carries too much of its heavy freight on the rear axle, as indicated by the frayed condition of the inner dual tires. In this picture the heavy packages have been unloaded, and the light stuff forward is shown as an ideal distribution of weight

moderate speed and load are combined, together with a nice discrimination as to distributing the load.

At this date the best place in the United States for tire mileage is Washington and three of the factors mentioned above are present, while the other two have considerable weight in making up the sum.

Tire Expert on Overloading

An expert in solid tires explained the precise effect of overloading, which includes unequal distribution of weight as treated in this article, as follows:

"In the process of manufacture, crude gum is mixed with pigments and the whole mass is kneaded together until the compound becomes homogeneous. After various intermediate steps, the rubber is placed in a mold and vulcanized. During vulcanization the tire assumes a more or less permanent form to which it will normally return if it is not stretched or compressed beyond certain definite limits. If the stretching or compression exceeds these limits, however, the strain will invariably cause a rupture or disintegration of the rubber.

"To illustrate: Take a strong, properly vulcanized rubber band. Stretch it moderately, release it, and it will return to its normal shape. The process may be repeated indefinitely, depending upon the quality of the rubber, and the band will resume its shape. Stretch it beyond its limit of elongation, however, and what happens? The rubber breaks and all the king's horses and all the king's men can't restore it to its previous condition.

"The damage has been done and the rupture is permanent. Similarly, a piece of rubber properly vulcanized may be compressed within certain limits, released, and it will resume its normal shape. The compression may be repeated an indefinite number of times, depending on the quality of the compound. So long as its limit of compression has not been reached, the rubber will continue to spring back into shape and nothing but abrasion or other physical or chemical action will destroy its elasticity.

"Compress it beyond its limit of cohesion, however, or, in

other words, beyond its power of resistance, and the rubber breaks down or ruptures just as inevitably as in the case of stretching beyond its limit of elongation. No method yet devised will restore to the unit its former elastic qualities. The difference between a rupture resulting from compression and one brought about by stretching is that in the latter the tear usually results in a clean separation, while in the former the rupture may not be noticeable because the broken parts are held in place by others not yet noticeably affected.

"Nevertheless the damage is done, and disintegration has commenced, not because the average load exceeded the limit of resistance, but because some one load exceeded it, and started the rupture."

The owner should always bear in mind that poor results with any make of truck tire are comparatively seldom due to defects in the materials or in the manufacture of the tires themselves, but may be reasonably expected should he shift to some other make of tires in the hope of obtaining better service. He must always figure on a considerable deterioration in the tires caused by wear and tear of everyday, knockabout, rough use over all sorts of pavements and roads and under all sorts of weather conditions, from the torrid days of July and August, when

the superheated asphalt and dirt of the highways over which the truck is obliged to travel well-nigh blister the tortured rubber as it toils on its rotary path, to the frigid days of December and January when the cold contracts the rubber and the ice and snow insidiously permeate the pores of the tread as it bumps over the frozen ruts in the roadway, receiving severe blows and sometimes cuts from stones and sharp pieces of ice.

Then, too, he must consider the character of the load to be carried by the machine, whether it is light or heavy, etc., for this has a great deal to do with the life of the tires, especially as regards the problem of scientific loading.

Driver Most Important Factor

But the factor which is most important in determining the length of life of the tires is the factor which it is most difficult to regulate—the personal equation. Some truck owners have the idea that, after they have bought their truck, or trucks, as the case may be, they have only to get a man who is capable of starting and steering the machine about the streets without running into things too often, and of changing gear or even making minor repairs when necessary. This is far from the true state of affairs at this juncture. The owner should remember that his own interests are at stake, that the sort of a driver he employs means dollars and cents to him, not only in the service he gets out of the truck, but also in the size and frequency of repair bills and, last but not least, in the amount of money he will be obliged to pay out for new tires.

Too much emphasis cannot be laid upon the importance to the truck owner of this question of selecting a driver who knows his business, who knows his automobile mechanics, and, above all, who appreciates the points of good truck driving and is proud of his knowledge in this respect and of his application of this knowledge. For there is more science to be found in truck driving than in a great many other pursuits which claim higher places in the sphere of business. It presents a practically limitless field for the application of mathematical principles and unbounded opportunity for the acquirement of manual dexterity and of mechanical skill.

Best Varnish Is Essential

Good Service Cannot Be Expected of This Beautifier and Protector if Made of Poor Materials

Varnish Must Be Allowed to Ripen Properly Before Using —Storage Place Should Be Uniformly Warm

VARNISH, of all the materials which are applied to the car to make it beautiful and give pleasure to the user, is at once the most sensitive and the most durable. Once assembled on the surface of the car in splendid unity it immediately becomes all things to practically all men.

The service it yields is manifold. Chiefly it is a protector and a beautifier. The varnish user demands that it should work precisely right under all circumstances. It must dry free from dust in the nick of time. It must have an undiminished luster. It must neither sweat, nor pit, nor enamel, nor do other hot-weather tricks. In a word, it must be a garment suited to all kinds of weather.

Varnish making is one of the most highly skilled industries. It is an achievement of science and chemistry. Every varnish maker has special formulæ and methods of manufacture, and mechanical equipment of the finest sort, and to-day varnish, prepared and ready for use, represents the finished product of highly specialized mechanical, scientific and chemical skill.

The laymen with his crude little outfit and his ancient formula cautiously extracted from age-worn tomes should be labeled "handle with care" when he sets forth to school the unsophisticated public in the mystery of making varnish. The automobile painter and the automobile owner should deal directly with the reliable maker of varnish who, with the experience and prestige of years of business, is able and glad to stand back of his products. In this way mutual interests may be safeguarded and the finish applied to the car given a prolonged lease of life.

Automobile varnish of the best quality is made of a combination of copal gum, a product of Africa, and turpentine and linseed oil. Zanzibar copal is said to yield a varnish of the very highest quality.

Many inferior gums or resins, turpentine substitutes, and adulterated linseed oil are consumed in making varnishes for automobile work, but all such varnishes are cheap only in the matter of price. In the end they are the most expensive materials purchasable.

Avoid the Use of Cheap Varnish

All cheap varnishes live on the surface of the car for a comparatively short period only. They lack the vital bone and sinew, and from the very first they are stricken with the "shadow of things to come." Such varnishes, of course, dry hard and fast in short order, but once dry and the story of their decline begins. They are devoid of the elastic properties and of the strength which comes alone from the rich and robust African gum.

It is therefore in order, first of all, for the car owner doing business with the painter to have it stipulated in the contract that a high-class varnish be used on the car.

Varnish should never be used until it is well aged and ripened. The leading varnish makers have thousands of gallons of varnish of the various grades tanked, and held for mellowing out, and taking on a condition, and an appearance, and an age that will make it rare and good, and distinguished in its class.

The untainted counselor in the ways of making varnish who would for some money consideration put the painter in the way of being his own varnish maker knows little, and apparently cares less, concerning this practice of giving age and a ripe

condition to varnish before using it. Nothing, however, is more essential; nothing has more to do with its excellence and nothing has more to do with the results obtained.

Even the working of varnish, its brilliancy, and its other characteristics cropping out in a hundred ways on the surface of the car, are in no small measure influenced and controlled by the manner of keeping the varnish preparatory for use. It should be kept in a warm room, preferably upon a shelf located at a point 5 or 6 feet above the floor.

This situation should be dry, and the warmth should be uniform. Varying temperatures keep a varnish in a state of unrest, whereas fine varnish should be disturbed as little as possible.

In not a few publications devoted to things pertaining to the automobile instructions have lately been handed out describing how to use varnish, and quite often these ways are more amusing than instructive. For example, we note that painters are gravely told to apply varnish thin and wipe it out over the surface thoroughly. Such information should under no circumstances be put into practice.

How Varnish Should Be Applied

Varnish should be applied to the surface in a rich, full volume, making the surface carry all it can assimilate and take care of. In this way, and only in this way, is the deep, lustrous, mirror-like surface so greatly to be desired on the automobile developed and rounded out.

Thin, skimpy, laboriously brushed-on coats of varnish are the natural forerunners of seedy, specky, dull, unsatisfying finished surfaces.

Any car owner who doesn't feel qualified to put on and handle such coats of varnish had better turn the work over to the professional painter, who by occupation is an adept in such things.

Rubbing varnish which precedes the finishing varnish on the surface—in fact, going directly over the color—is used for the purpose of building up a surface level and smooth and strong to support the finishing varnish coat.

Rubbing varnish is made up in a different manner from finishing varnish in that it carries harder gums, less oil, and has generally a different composition of ingredients. It is chiefly a bodying up medium, but like the finishing varnish it should be a first-class article. Great things are expected of it.

The fine, clean, smooth, and level surface which the automobile must have to please its owner is worked out in this way: As soon as the color or combination of colors are placed in position upon the surface the entry of rubbing varnish is made. It must, to meet requirements, go to the surface as free from brush marks and roughness as possible. Lacking the flowing properties of finishing varnish, it seldom works out to the same degree of fineness. But if kept clean and worked quickly and skilfully all the natural roughness of the coats will be held down to the minimum. Then in the rubbing use perforated rubbing pads of heavy felt, wet, and dipped in No. 00 pulverized pumice stone. Use plenty of the pumice stone until the desired surface is practically reached, whereupon finish off with a clean piece of felt dipped freely in water; giving the surface, in fact, a water rub. Then wash up carefully and follow with the finishing coat of varnish.

GERMANY, during this year's military manœuvres, is demonstrating the constantly increasing commercial importance—some say indispensability—of the motor car. The reading public know well the use that Germany is making of the automobile for army purposes. It is true that, owing to the expense of maintaining a motor car park, the automobile army corps has never been completely mobilized in the German army. Therefore an authentic test of the total complicated apparatus, including portable workshops, gasoline and tire stations, has never been entirely demonstrated. This leaves Germany behind France in respect of statistical details.

Digest of the Leading Foreign Journals

Nougier Discovers that Formulas for Adiabatic Compression Point Way to Recovery of Thermic Waste in Combustion Engines and Many Other Gains Besides— New Porous Metal Multiplies Battery Capacity—Diesel Locomotives

DIESEL System for Automobile Motors—With a view to obtaining for small stationary motors as well as for automobile and boat motors the advantage of operating very economically with any one of a variety of cheap fuels, this advantage being at present possessed by the Diesel motors exclusively, Mr. A. Nougier, of Paris, proposes in *Le Génie Civil*, No. 17 of this year, to try preheating of the air charge as a substitute for the very high compressions employed under the Diesel system. His article is reproduced in German in *Gasmotorentechnik* for May and June, with a critical review promised for July. Nougier tries to show, first, that it is possible by preheating of the air and moderate compression to obtain a temperature at the end of the compression stroke sufficiently high to effect the ignition of the liquid fuel injected at that moment and yet not accompanied by the high pressure used in ordinary Diesel motors, in which compression alone is depended upon for producing the heat for ignition; secondly, that the expansion of the air which is caused by preheating, and which results in a reduced supply of oxygen to serve the combustion of the fuel, need not interfere with the success of the plan, and, thirdly, that the provision for preheating the air need not be too cumbersome, but can be managed within space limitations suitable even for automobiles.

In Diesel motors as now constructed a compression of 30 to 35 atmospheres produces a temperature of more than 500 degrees C., which suffices for igniting crude oil or even tar oil, but this high compression necessitates the installation of a separate air-compressor for injecting the fuel against the cylinder pressure, and this compressor, which of course must operate at more than 35 atmospheres in order to force the fuel in, not only absorbs about 7 per cent. of the motor's power, but renders an extremely expensive and heavy construction necessary in order to safeguard the tightness of pistons and valves. These drawbacks should, if possible, be removed.

THE PRINCIPLE OF PREHEATING

Air follows approximately the formulas for adiabatic compression, with 1.41 as exponent. These are:

$$(1) \quad \frac{p_1 \times v_1}{T_1} = \frac{p_0 \times v_0}{T_0}$$

$$(2) \quad p_1 \times v_1^{1.41} = p_0 \times v_0^{1.41}$$

Equation 2 can also be written:

$$(3) \quad p_1^{0.71} \times v_1 = p_0^{0.71} \times v_0$$

By dividing equation 1 by equation 2, there is obtained:

$$(4) \quad T_1 = T_0 \left(\frac{v_0}{v_1} \right)^{0.41}$$

and by dividing equation 1 by equation 3, there is obtained:

$$(5) \quad T_1 = T_0 \left(\frac{p_1}{p_0} \right)^{0.29}$$

In these equations $\frac{p_1}{p_0}$ stands for the pressure after compression divided by the pressure before compression: $\frac{v_0}{v_1}$ for the volume of the air after compression divided by the volume of the air before compression or, in other words, the compression ratio:

T_0 for the absolute temperature before compression and T_1 for the temperature after compression.

From equations 4 and 5 the author draws a diagram from which the value of T_1 corresponding to different values of $\frac{v_0}{v_1}$ of $\frac{p_1}{p_0}$ and of T_0 may be read. The T_1 curves of this diagram are straight lines for any given value of $\frac{v_0}{v_1}$ or $\frac{p_1}{p_0}$. This diagram now gives interesting information bearing on the subject.

Usually it is air of about 15 degrees C. which is taken into a motor, but by contact with the hot cylinder walls this air reaches about 40 degrees during the compression, apart from the rise in temperature due to the compression itself. Assuming 40 degrees as the initial temperature, in accordance herewith, and a pressure ratio (p_1 divided by p_0) equalling 30, corresponding to the use of 30 atmospheres of compression in a Diesel motor, the diagram shows a value for T_1 of 566 degrees, and this agrees with thermometer readings from Diesel motor practice, thus confirming the diagram.

But the diagram shows also that the T_1 value obtained with a starting temperature of 40 degrees does not rise very fast by increased compression. With 50 atmospheres, for example, it reaches only 700 degrees. On the other hand, the same end-temperature can be reached with only 20 atmospheres of compression if the air is preheated to 80 degrees, or by 15 atmospheres and air preheated to 108 degrees. These examples show what advantages are within reach by preheating, if suitable arrangements are provided for heating the intake air by means of the exhaust gas without causing excessive counter-pressure against either the intake or the exhaust. And as the formulas, or the diagram, show that there is question only of raising the intaken air to a temperature of 100 degrees, at most 150 degrees, the practical difficulties do not a priori seem particularly forbidding.

The process in view is not comparable with the preheating system employed in automobile motors solely for the purpose of facilitating vaporization, as this preheating must be kept within very narrow limits in order to obviate premature ignition of the highly inflammable fuel.

Whatever reduction in the thermic efficiency is involved in the reduction of the compression contemplated by this method should be more than offset by better mechanical efficiency. The fuel injection, especially, would require much less power than with the high compressions.

Motors with 10 atmospheres of compression, preheating to 150 degrees and with a resulting temperature of 560 degrees available for the ignition of crude oil could be built in sizes as low as 30 horsepowers or less.

APPLICATION TO AUTOMOBILES.

It seems that automobile motors without carbureters or ignition devices, and to be operated with crude oil or naphthalene, could be built on this system. Regulation of the power by means of a good injector pump could be made more dependable than

the present throttling system dealing with gases. As the ignition would not depend upon the maintenance of those proportions which produce an explosive mixture, the power development for a given motor speed or the motor speed for a given load might perhaps be extended over so wide a range that the change-gear mechanism could be dispensed with. In other words, a possibility of especial interest for the evolution of motor trucks is at hand by which the three most sensitive organs of the motor vehicle, the carbureter, the ignition device and the gear box, would make room for three more robust organs: namely, an injector pump, an injector and a preheating device, the latter also taking the place of the muffler.

THE LIMITS TO PREHEATING

The fact that heated air weighs less than an equal volume of cold air sets certain limits for the preheating method, since, for example, in the case of naphtha 1 pound of the fuel requires 15 pounds of air for effecting complete combustion, and in practice even a surplus above this figure because all the oxygen in the air does not get a chance at the fuel. The author shows by calculation that excessive preheating for this reason would, in fact, lead to incomplete combustion but also that air heated only to 100 to 150 degrees will afford a surplus of oxygen, although precautions may be necessary for limiting the heating when the motor is working under full load and the heating capacity of the exhaust gases is at its maximum.

A preheating arrangement is described shaped as a large muffler with tubular flues for the exhaust gases flowing in one direction and the intake air flowing in the opposite direction in the interstices, with baffle plates to obviate short-cuts and compel utilization of all the heat. Even when a motor runs idle and gives off comparatively cool exhaust gases it is necessary that the preheating should be so high that ignition is effected, and it is a question whether the gases can heat all the air which is required, under these circumstances. A 200-horsepower motor of a certain construction is mentioned whose exhaust, when it is operated at full load, reaches a temperature of 465 degrees, but only 135 degrees when it runs idle with its minimum of fuel. While these figures apply to operation with cold air intake, they indicate the difficulties. Such a motor requires 1,060 cubic meters of air per hour, and this at a temperature of 100 degrees would weigh 1,000 kilograms. The exhaust gas generated by the motor running idle, using only 10 kilograms of fuel per hour, would weigh 1010 kilograms. This at a temperature of about 135 degrees is required to heat the 1000 kilograms of intake air to 100 degrees in a small fraction of a second. The author attempts to show what the areas of heating surface in the preheating device must be in order to comply with the needs and arrives at the result that it would be preferable to reduce the preheating to 80 degrees for operation under the throttle, which would still give 720 degrees final temperature for ignition and would make it easier to avoid overheating when running under full load. He figures that the preheater for these conditions should be only 1.06 meter long, 0.6 meter in diameter and provided with 100 flues of about 1½ millimeter diameter. The speed of the exhaust and of the intake air is figured at 19 meters per second, however, which seems high.—From *Gasmotoren-technik*, May and June.

Railway Motor Cars—While most early attempts at the employment of internal combustion motors for the propulsion of railway cars have been discontinued by reason of difficulties in adapting the change-gear mechanism to railway conditions, recent efforts looking to the use of Diesel motors in railway service are even more ambitious, in so far as the aim is no longer merely to supply a self-powered car for small sidelines and interurban traffic but actually to supplant the full-fledged steam locomotives. The Diesel two-cycle locomotive with cylinders of huge size disposed in V-arrangement is still on trial in Germany. It weighs 85 tons, develops 1,000 to 1,200 horsepower, looks like a steel passenger coach from the outside and runs

with either end forward, the engine being located in the middle and the two ends nearly identical in the matter of access to control levers. Its construction has taken five years, as great difficulties were encountered in balancing the moving masses and providing for starting and maneuvering facilities by means of an auxiliary engine and two special air pumps. *The Engineer* of England tells of a somewhat similar enterprise undertaken by the Closed Circuit Air Transmission Company, Ltd. The power is furnished by a two-cycle Diesel motor, burning Texas oil, and the need which exists with all Diesel motors for a powerful air compressor is here exploited to make the compressed air serve not only for the starting and the injection of fuel but also for the transmission and regulation of the power delivered to the driving wheels of the locomotive. From the tanks brought under pressure the air is taken as needed into an air engine with double-acting cylinders, exactly as steam is taken from the boiler to a steam engine, and the locomotive is driven from this air-engine. The compressed air is heated by means of the exhaust gases from the motor before delivered to the engine and the air-cylinder exhaust is carried back to a reservoir to be recompressed with as great a saving of heat as practicable.—From *Auto-Technik*, June 14.

Porous Metal for Battery Grids—The scientific side of a recent invention by Prof. Hannover of the technological institute of Copenhagen, Denmark, was submitted to the French *Académie des Sciences* at its session on June 10. By taking advantage of the fact that one constituent of a metallic alloy in some instances solidifies more rapidly than another when passing from the molten state, Mr. Hannover has succeeded in expelling by industrial means the portions which remained liquid in half-molten plates of metal, using centrifugality as the active agency, and has obtained highly porous plates composed solely of the more resistant constituent in the alloy. He has for example thrown out antimony from an alloy of lead and antimony. The process is easier the lower the fusion point of the alloy. But a porous lead plate produced in this manner may be filled with copper or silver by electrolysis, and the lead may then be thrown out, leaving a porous copper or silver plate. The method has at once been applied to the production of grids for storage batteries, and these have an active surface five times greater than any which can be produced by mechanical means. They render it possible to either dispense with oxides, which are liable to be shaken off the plates unless expensive precautions are taken against this possibility, or to fill the porous plates with oxides, thereby greatly increasing the capacity of a battery. Batteries of this kind have been tested in the Danish government railway service, and the results are reported to have been very encouraging.—From *Die Automobil-Welt* and *Le Génie Civil*, June 22.

To Reduce Friction of Pistons—While the thermal efficiency of motors is the feature in their operation upon which most designers spend their best efforts, G. H. Tremolières, of Paris, has conceived a method of enhancing the mechanical efficiency through ample lubrication of the pistons. This, he claims, always results in better compression and increased power. He cuts three sharp-angled grooves circumferentially around the lower portion of the piston, and these act as troughs which, by reason of their location, are filled completely from the oil splash. Narrow grooves traced in the piston surface connect these troughs, and similar narrow grooves are traced upward to the grooves in which the piston rings are lodged. Only the topmost piston ring is isolated from this canalization system. The theory is that, as soon as the piston begins to descend, the oil in the troughs is compressed and forced upward through the canals, reaching all parts of the piston and piston ring surface with great regularity. The improvement is applied to old as well as to new motors.—From *La Pratique Automobile*, June 13.

Four-Speed Transmission

W. H. Cameron, S. A. E., Predicts Its General Adoption—Essential to Power, Economy and Flexibility of Control

Virtues of Four Speeds Graphically Illustrated by Diagrams and Tables

It may sound strange to predict that the next radical change in automobile engineering will be the general adoption of the four forward speed transmission, but in my opinion it is bound to become generally used in all good American cars.

To-day it is found in this country only in the highest-priced cars; in fact, the cars selling under \$3,000 that now have four speeds forward can be counted on the fingers of one hand. Abroad, where special reasons have forced the use of the four-speed transmission in the large majority of cars, its advantages are better understood.

One reason for its use on foreign cars is the extremely small bore of cylinders, due to the fact that the tax is graded by the size of the bore. An American car of more than 4-inch bore is in little demand in England, where a bore of 3 inches and a fraction is generally used with an extremely long stroke to give the maximum horsepower.

Under such conditions the four-speed transmission is positively essential, both to economize the power and to gain the required flexibility of control. Its use under these conditions, however, only serves to illustrate the actual money-saving in fuel and less strain upon the machine, as well as the advantages in driving which will come with the widespread adoption of the four-speed gear-box in America. For the same engineering principles apply in our case as in theirs.

Higher Gasoline—Lesser Bore

Before passing the point of economy, let me say I believe the tendency in America will be decidedly to smaller bore. This is due to the fact that everybody knows gasoline is becoming scarcer, and is sure to mount in price. I think the small bore is coming, even with the effort to popularize the six-cylinder car. The popular six-cylinder car of the future will be one with about the same piston displacement as the standard fours of the present.

The four-speed gearbox has been confined to high-priced cars in America, primarily because of its prohibitive cost. It means a complete change of design—more gears—wider gear centers—a big expense for the improvement, when all are totaled.

Motorists generally realize now that the life of a car de-

pends upon its use and abuse. It does not take a car owner long to reason to the fact that making a car put forth every ounce of power on frequent grades is highly detrimental.

"Learn to control your car exclusively by the gas, as far as possible," says the instructor in motoring, to the school. The salesman says the same thing to the beginner. Everybody who gives advice on running a car says it, thereby admitting that something is wrong, or lacking in the transmission. Yet everybody realizes on a moment's reflection that the transmission is the logical first means for the control of the speed.

It takes long experience and special aptness—I may say genius—for driving to know just how far to throttle in regulating a car by gas. Few ever learn it perfectly. The driver who does it with any degree of skill knows his car like a human friend and brother, and is also guided by some sixth sense or intuition.

With the big majority this dependence almost entirely on the gas for regulating the car is a matter of guesswork. It is disastrous not only to the pocketbook but in not a few cases to human life. It costs money to pull the engine speed down until the car almost quits on high and then to race the engine to pick up on second, as is so commonly practised.

We have grown used to the sight of the driver on high gear, killing his motor at street crossings, street car tracks and railroad tracks, by throttling down before he can get his clutch out.

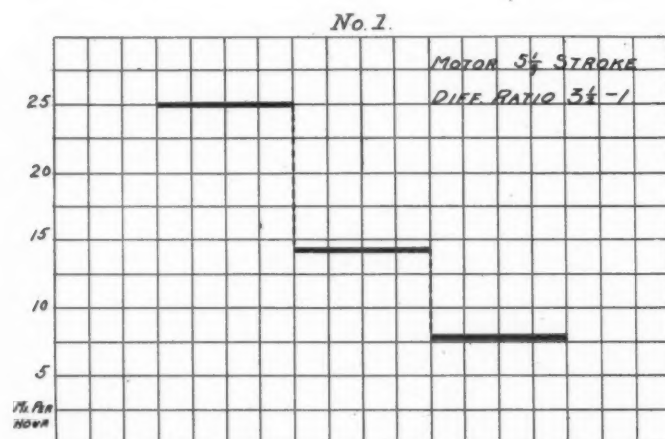


Fig. 1—Three-speed transmission. Note gap between second and high compared to the other

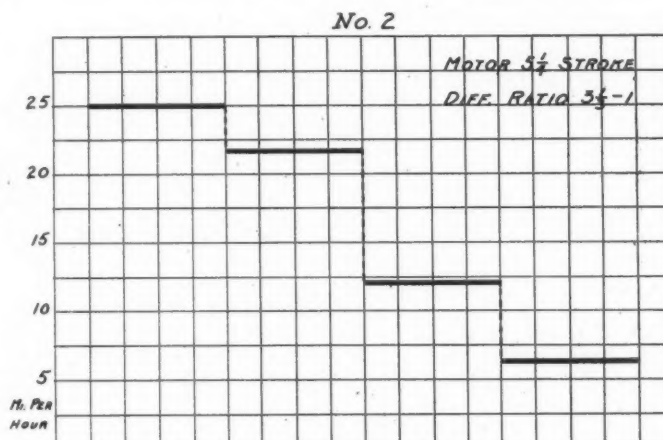


Fig. 2—Showing four-speed transmission, with the indirect fourth

If, instead, he slips into third speed on a proper four-speed transmission, he has a gear ratio which is practically the same as a $4\frac{1}{2}$ -to-1 rear axle—by having which, as anyone knows, the car can easily be throttled down to 2 or 3 miles an hour, and still pick up quickly.

By this time it should not be necessary to explain that the basic purpose of four-speed transmission is not to satisfy a mania for more speed. This was a common error when the four-speed transmission was rare practice. Four-speed transmission provides an efficient, feasible and logical control of the car—a control not based on guesswork, but upon an accurate, proved and dependable gearbox, built in accordance with universally acknowledged mechanical principles and in accordance with the best engineering practice the world over.

Four Speeds Easy on the Motor

It provides this control without wasting fuel, without racing the motor, and consequently with far less vibration. It relieves the motor of undue strain, especially in taking heavy grades. With four speeds (the direct drive being on the fourth) the long sand stretches, the heavy mud roads, the miles of axle-deep slush, the hills and mountains may be negotiated without fear of punishing the motor in the way that now works havoc and shortens by years the life of the best car built.

Unless one has actually driven with a four-speed transmission, he does not know the satisfaction and pleasure that it adds to

driving. To those who have not tried it I would say: Make a test of two cars, one with a proper four-speed gearbox and the other with three speeds, both having the same topgear ratio, and thus having the same speed possibilities. You will be amazed at the difference in efficiency of control; the certainty of having just the speed you want when you want it; the reduction of the work of driving. You will never want to go back to a three-speed transmission.

Grade climbing is one of the problems most satisfactorily solved by the four-speed gearbox. Every motorist knows that unless he has an engine on which he can depend for a practically unlimited pull, he will find the inclination of many grades just a trifle too much for his top-speed. On such a grade, with a four-speed gearbox he can drop to third speed and it takes his car up like a bird. With a three-speed car he has to drop from top speed to second—and he makes an awful drop—in fact, almost 50 per cent. lower than high. If you have had this experience you know that resigned expression with which everybody settles back in the car to make the best of it until the car can be thrown into high gear.

The same condition is encountered in many roads which are just a little too heavy for top speed. The funeral pace then has to be taken on second speed, although the car is actually capable of much better speed on these roads.

We shall understand the necessity of the four-speed trans-

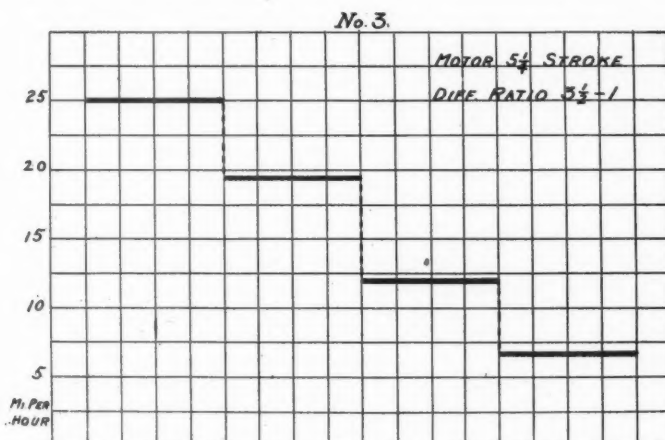


Fig. 3—Four-speed transmission with speeds about equally spaced

mission more perfectly if we say that, while the speed ratios of a proper four-speed car are 1, 2, 3, 4 (the fourth being the top speed), the speed ratios of a three-speed car are really 1, 2, 4, the gap between second and high being so great that there is really no third speed. So when we put in a four-speed gearbox we are actually adding a third speed to the car.

Many veteran motorists agree with me that the four-speed gearbox is needed everywhere, every day, not only to climb grades, and not only to do away with unnecessary engine racing, but to provide a really essential speed between second and high, where the gap now exists.

Types of Four-Speed Transmission

The greatest question in four-speed transmission is the ratios of gearing, or number of times the motor must turn over to the number of revolutions of the rear wheels. The subject has engaged the attention of the leading engineers in Europe and America for several years, but it is only lately that they have practically agreed as to the direct drive.

There are two types of four-speed transmissions: One direct on third speed, the other direct on fourth. The latter is generally conceded to be greatly in advance of the former. This is overwhelmingly proved by the practice on the great majority of cars now using the four-speed gearbox. Of 157 four-speed foreign cars, 132 have the direct drive on fourth. Of the American cars now using four speeds, 75 per cent. have the

direct drive on the fourth. As the four-speed gearbox gains in favor, the indirect fourth will drop out overnight.

A study of the tables and diagrams shown herewith will enable the reader to see the difference at a glance. Table 1 shows a common three-speed transmission, which is about what is fitted to 85 per cent. of the three-speed cars. It will be noted that three and one-half rear axle gear ratio is used in all three tables. If the driver rushes his car at a hill on the high gear and has to change down, he goes to second, which is almost 50 per cent. lower than high. It will also be noted that in this transmission the first or low speed is only 11.20 to one. This is the reason that so many cars are forced to back over the stiffer grades if there is no other way round. The reverse, of course, is lower. This is the result of transmission design.

Take the next table, No. 2. It shows a transmission of a well-known and popular car. This is for the motorist who thinks he wants to burn up the roads, and who buys a car with an indirect fourth. He overlooks the fact that he loses almost all that he thinks he gains through the inefficiency of the gears, and has two speeds which are almost alike. It will also be noted that he has not much better second and low than his friend with the three-speed.

The ideal transmission, in my opinion, is shown in table No. 3. It will be seen that, when it is necessary to change from fourth to third, a speed is obtained which enables the car to go over the hill at a fairly good rate. The second in this is almost between the first and second of the others; consequently, if the car is fitted with a good clutch, the operation for all ordinary driving resolves itself down to a three-speed job (as the second can be used for starting on the level), leaving the extremely low first and reverse for emergency.

In the above I have but briefly outlined facts on which the judgment of the best engineers at home and abroad is based, in favor of four-speed transmission. Taking all these facts (and the showing of the tables and diagrams herewith) into intelligent consideration, everyone must realize that four speeds, with the direct drive on the fourth is the immediate step in the evolution of the leading cars.

Civilians for Britain's Motor Army

England is adopting new, up-to-date tactics in the management of her army. The latest thing is a scheme whereby civilians are to be enrolled in the special service as army motor car drivers. The department which takes them is known as the Special Reserve. This wing of the army comprises men who perform duties similar to those performed by them in civil life and needing no instruction as soldiers. The new reserve will consist of mechanical transport motor-car drivers for the army Special Corps, to be enlisted for 1 year at any age between 18 and 45, provided they are sound in health and measure 5 feet 3 inches in their boots.

Tables Showing Value of Four Speeds With Direct Drive on Fourth

TABLE NO. 1		
Speed	Trans. ratios	Ratios— engine to wheels
3	1—1	3.5
2	1.8—1	6.30
1	3.2—1	11.20
R	3.88—1	13.58

TABLE NO. 2		
Speed	Trans. ratios	Ratios— engine to wheels
4	.86—1	3.01
3	1—1	3.5
2	1.76—1	6.16
1	3.4—1	11.90
R	4.6—1	16.10

TABLE NO. 3		
Speed	Trans. ratios	Ratios— engine to wheels
4	1—1	3.5
3	1.29—1	4.51
2	2.1—1	7.35
1	3.76—1	13.16
R	4.57—1	15.99



Tells of Heavy Motor Frame; Wants Ignition Information; Best Oil for Clutch Leather; A Carbon Remover; Rules of the Road in New York; Two Tour Routes; Detecting Carbon; Asbestos for Windings

Likes a Heavy Motor Frame

EDITOR THE AUTOMOBILE:—A few weeks ago I noticed in THE AUTOMOBILE a description of a light motor frame with full directions as to its manufacture. In connection with this subject I would like to show you a frame which I have been using with great success for the last 2 years. It is a much larger affair than the frame described in your paper, but I think for a man in the repair business it would be superior because it is not necessary to bolt it down, and hence can be moved about the shop as desired. The cost of the frame is about \$60, which is, of course, considerably more than what would have to be paid for that described. A sketch of this frame is shown in Fig. 1. The end view of the frame is shown at A and the elevation at B.

Rockville Center, N. Y.

REPAIRER.

Troubled by Weak Spark

EDITOR THE AUTOMOBILE:—Some time back I think I saw the answer to the following question in THE AUTOMOBILE, but would like to ask a further explanation: How can a high-tension magneto be connected to run through a four-cylinder coil? And would it give a better spark? Would it do any harm to either magneto or coil?

I have a La Coste magneto and it does not deliver a strong enough spark with the throttle wide open, and consequently skips. If running the magneto through a coil will not cure the trouble, kindly tell me what will. Do you think it could be short-circuited?

Bridgeport, Conn.

J. W. R.

—You cannot use your La Coste magneto in this way. It is already a high-tension instrument and hence cannot be put through another coil in the hope of increasing the intensity of the spark. The magnets probably need recharging or there is a short-circuit through several of the coil windings. Do not attempt to repair this yourself unless you have full facilities for doing complicated electric work. Send it back to the factory and you will find it cheaper in the end.

Which Is Better Clutch Oil?

EDITOR THE AUTOMOBILE:—Would you kindly tell me which is the better oil for softening the leather on a cone clutch? I have heard that neatsfoot and castor oil are both good, but I would like to know which is the better.

Hackensack, N. J.

READER.

—You will find that neatsfoot oil is a little better for softening purposes than the castor oil, although they are both very good for this purpose. The main point to remember is to be sure to let the oil stand on the face of the clutch for at least 24 hours before again using the clutch, for, if this is not done, the oil will not get beneath the surface of the leather and will be wiped off the surface before it has a chance to soak in. In case the leather has become much glazed, the best thing to do is to renew it, as it will never regain its old usefulness.

Recipe for Carbon Remover

EDITOR THE AUTOMOBILE:—I secured the following formula for removing carbon from a man who claims to be a Detroit expert on the subject, and wish to know what THE AUTOMOBILE thinks of it:

Gasoline	1-2 gallon
Kerosene	1-2 gallon
Salt	2 drams
Cooking soda	2 drams
Aqua ammonia	4 ounces
Eagle concentrated lye	1 pound

I have also noticed in THE AUTOMOBILE a mention of acetone in connection with kerosene. Could this be used in one cylinder while the other three are running? Please tell me how to use the latter decarbonizer.

Boonville, Miss.

L. D. RINEHART.

—The formula you give seems good, as the ingredients should all be effective. As a matter of fact, however, the secret of keeping the cylinders free from carbon is to give them constant attention instead of only at intervals. Many automobilists make a point of injecting about a tablespoonful of kerosene into each cylinder after they have returned from a run. The motor, being warm, transforms the kerosene into a vapor, and while in this state it is a very strong carbon solvent. If this is done consistently there should be no carbon troubles. Buy good lubricating oil and use the kerosene as mentioned above and you will not have any trouble at all.

In using the mixture of kerosene and acetone it can be applied in the same way as the kerosene alone, or it can be poured into one cylinder while the other three are left alone until the cylinder in which the acetone is placed is cleaned out and is again ready to fire. Do not put in more than a tablespoonful at a time, as, if you do, it will run past the cylinders too rapidly and get down into the oil supply, ruining its lubricating properties. Of course, it will be impossible to put the mixture into the cylinder while the motor is running.

By far the better way, in using a decarbonizer, is to remember the rule that a little at a time is much better than an enormous quantity all at once. If you will keep your oil supply normal, buy the best possible oil, inject one tablespoonful of kerosene into each cylinder after a run; your cylinders will always be clean and bright.

Wants State Rules of Road

EDITOR THE AUTOMOBILE:—Would be pleased to have you give me the rules of the road and the provision of Article 11 of the highway law of the state of New York through the "Letters Answered and Discussed" columns.

Eaton, N. Y.

SIDNEY B. WESTCOTT.

—The New York state law as regards signaling and rules of the road is as follows: A person operating or driving a motor vehicle shall, on signal by raising the hand, from a person riding, leading or driving a horse or horses or other draught animal, bring such motor vehicle immediately to a stop, and, if traveling in the opposite direction, remain stationary for so long

as may be reasonable to allow such horse or animal to pass, and, if traveling in the same direction, use reasonable caution in the act of passing such horse or animal; provided that, if such horse or animal appears badly frightened or the person operating such motor vehicle is signaled so to do, such person shall cause the motor of such vehicle to cease running so long as shall be reasonably necessary to prevent accident and insure the safety of others. In approaching or passing a car of a street railway which has been stopped to allow passengers to alight or embark, the operator of every motor vehicle shall slow down and if it be necessary for the safety of the public he shall bring said vehicle to a full stop. Upon approaching a pedestrian who is upon the traveled part of any highway and not upon a sidewalk, and upon approaching an intersecting highway or a curve or a corner in a highway where the operator's view is obstructed, every person operating a motor vehicle shall slow down and give a timely signal with his call, horn or other device for signaling.

The rules of the road are: Whenever a person operating a motor vehicle shall meet on a public highway any other person riding or driving a horse or horses or other draught animals or any other vehicle, shall seasonably turn same to the right of the center of such highway so as to pass without interference. Any such person so operating a motor vehicle shall, on overtaking any such horse, draught animal or other vehicle, pass on the left side thereof, and the rider or driver of such horse, draught animal or other vehicle shall, as soon as practicable, turn to the right so as to allow free passage on the left. Any such person so operating a motor vehicle shall, at the intersection of public highways, keep to the right of the intersection of the centers of such highways when turning to the right and pass to the right of such intersection when turning to the left.

A full copy of the laws of the state may be secured by application to Edward Lazansky, Secretary of State, Albany, N. Y.

From Yazoo City to Dayton

Editor THE AUTOMOBILE:—I am contemplating an automobile trip from Yazoo City, Miss., to Dayton, Ohio, *via* Memphis, Tennessee and Louisville, Ky. Will THE AUTOMOBILE give me the best route through Tennessee and Kentucky?

Yazoo City, Miss.

A. S. GARDNER.

—The best route to follow through Tennessee and Kentucky would be after you have reached Memphis to take a sharp turn over to Tusculumbia, Ala., and thence up through Nashville, Bowling Green, Ky., Louisville, Lexington and Dayton. The roads from Memphis to Tusculumbia are fair to bad, the best way to proceed being by local direction through the following towns, asking in each town for the best route to the next: Germantown, Collierville, Moscow, La Grange, Grand Junction, Saulsbury, Essary Springs, Corinth, Burnsville, Iuka, Cherokee, Barton, Tusculumbia. From Tusculumbia to Nashville the same directions apply, the best method being to inquire from one town to the next, as the roads are in doubtful condition and definite information is scarce. The towns passed through are: Tusculumbia, Sheffield, Ala., Florence, St. Florian, Green Hill, Loretto, Tenn., Pleasant Point, Dunn, Lawrenceburg, Crestview, Williamsville, Sandy Hook, Ridley, Columbia, Brentwood and Nashville. From Nashville to Bowling Green is a direct route through Goodlettsville and Franklin. Continue on to Louisville by aid of local direction. From Louisville to Lexington you are on good pike road all the way. It is an easy road to follow, leading through Shelbyville, Peytona, Frankfort and into Lexington. From Lexington to Dayton the route lies direct through Cincinnati. From Lexington to Cincinnati is nearly all good macadam through Georgetown, Corinth, Williamstown, Crittenden, Covington and Cincinnati. From Cincinnati to Dayton is over level country and excellent gravel pike roads. Pass through Reading, Sharon, Pisgah, Mason, Lebanon, Ridgeville, Centerville and Dayton.

The information on the first part of the route is to say the

least hazy and should be followed up closely by local inquiry. The motoring clubs, garagemen, etc., along the route will no doubt be able to direct you from town to town. The towns themselves you will know from the above directions. The route you will cover on your trip will be largely the same as that taken on the Glidden tour of 1910, so that additional light on the trip may be had from the stories of this tour in the press of that time if you have access to a file. There has been little change in conditions since then. The latter part of the route is over good roads and should offer you no difficulties.

From Washington to Washington

Editor THE AUTOMOBILE:—Noticing that THE AUTOMOBILE furnishes information regarding routes, I wish to have the following question answered: I intend to leave Washington, N. C., for a pleasure trip to Washington, D. C. I am entirely in ignorance as to which of the several routes will be the best for automobile travel. I should leave here, going to Raleigh, N. C., then to Winston-Salem, N. C., Roanoke, Va., Staunton, Va., into Washington. Or, I could go by the way of Weldon, N. C., Petersburg, Va., Richmond, Va., Alexandria, Va., and thence into Washington, D. C. Which of these two routes is the better?

Also tell me what are the requirements for licenses in the states which I will pass through, that is, North Carolina, Virginia, Maryland and the District of Columbia.

Washington, N. C.

WILLIAM KNIGHT.

—It is difficult to state which of the two routes would be better. If you go *via* Roanoke there will be some very dangerous spots which it would be inadvisable to tackle unless you have the utmost faith in your car, while in the route *via* Richmond you will be up against some very bad dirt roads and, in many cases, mud-holes. With a good strong car that could be depended upon, the route *via* Roanoke would be better. You would pass through Raleigh, Durham, Stokesdale, Martinsville, Roanoke, Lexington, Staunton, Winchester, Washington. Some very good stretches of stone road are mixed in with fair to poor dirt roads; the latter predominate.

The requirements of the states for an automobilist passing through them are as follows:

North Carolina.....No fee for tourist licensed in own state.
Virginia.....No fee for less than 8 days, twice a year.
Maryland.....No fee for less than 8 days, twice a year.
District of Columbia..No fee for tourists licensed in own state. Register with Secretary of the Automobile Board, Washington, D. C., within 24 hours.

When Is a Motor Carbonized?

Editor THE AUTOMOBILE:—When a motor is badly carbonized, how can you tell it? What are the symptoms of this trouble? In other words, how can it be ascertained that it is time to remove the carbon from the cylinders? What is the best way of doing it? Is a mixture of kerosene and acetone as effective as hand-scraping?

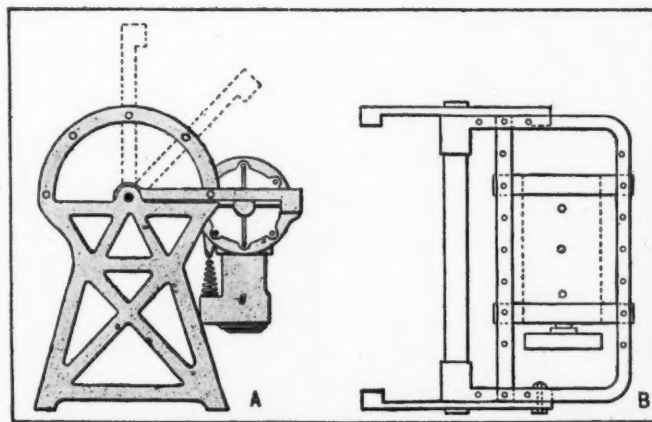


Fig. 1—Type of motor frame approved by repairman

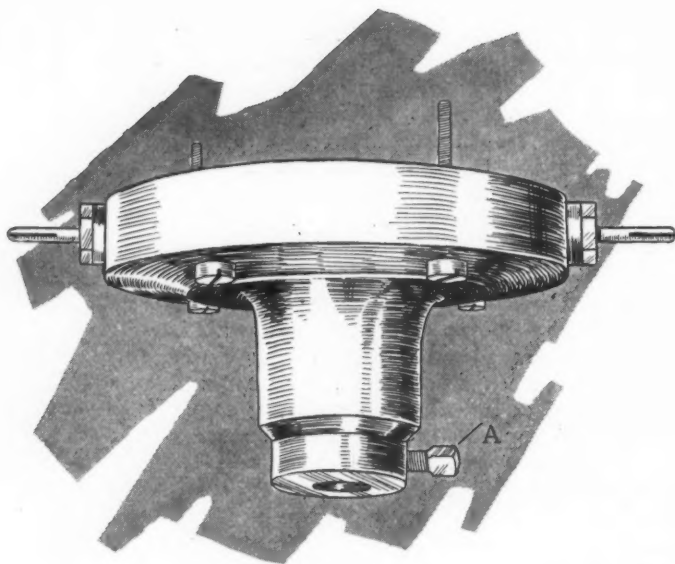


Fig. 2—La Coste timer, showing stud which holds shaft

(2) I have a rattle in my gearset which I think is caused by the teeth on one of the gears being slightly battered on one edge. Is there any way of remedying this without taking down the entire gearcase? My car is an Overland model 59.

(3) After my gas generator has been in operation a short time the gas tube fills up with water, causing the lights to flicker. What is a simple remedy for this?

East Canaan, Conn.

D. C. CANFIELD.

—(1) Carbon troubles can be detected when they are far advanced by a knock in the motor due to preignition. A piece of glowing carbon will be hot enough to ignite the next charge when it is compressed to a degree less than that at which it is regularly fired. When ignited before dead center the charge will cause a knock, as it will act against the direction in which the piston is moving. A loss of compression is often caused by carbon. A flake of it will get under the seating of a valve and will not allow the valve to come down squarely on its seat and, as a result, a leak will be found. A decided falling off in power on the hills will indicate this condition. Misfiring is caused by carbon deposits on the electrodes of the spark-plugs. The current cannot jump the gap across the dirty points and, consequently, there is no spark. If the flake of carbon gets under the intake valve it will often cause backfiring into the intake manifold, which will be evidenced by the noise familiar to all automobilists. It is readily distinguished from the muffler explosion, as it is not nearly so loud. If the motor continues to run after the spark has been shut off you can be sure that your cylinder has a large deposit of carbon. The continued running of the motor, apparently without a spark, is from the same cause as the knock. That is, a glowing piece of carbon acts like an electric spark and causes the motor to keep on running. The most common method of detecting advanced carbon troubles is by observing the knock and loss of power on hills due to reduced compression.

(2) This will depend on where the battered gear is and how it is battered. The probabilities are that there is something loose, as a bur would soon be worn off a tooth if it was causing a rattle. Lost motion between the teeth of two wheels will cause the trouble, as will also looseness on the shaft which holds the wheel. The gearset ought to be taken down and thoroughly examined, as it is very probable that the rattle is not the result of the battered tooth but of the same cause which made the tooth become battered. Look especially for worn bearing bushings.

(3) You are feeding too much water to your carbide. As you do not mention the make of the generator which you are using it is impossible to tell you how to cut down the amount of

water. There is probably a key on the bottom of the generator with which you can accomplish this purpose. The jar of the moving car has probably loosened the key which controls the flow of water.

Another possibility is that you have a generator of the type in which some of the gas tubes pass through the water. If these tubes become leaky some of the gas gets into them, causing the trouble.

Suggests Asbestos for Winding

Editor THE AUTOMOBILE:—In your issue for January 15 I notice that you recommend a thin winding of hemp beneath the piston rings to tighten them when worn. Why not strips or threads of asbestos? I should think they would be better for this use, as there would be no danger of the hemp charring and burning under the heat of explosion.

S. S. RYAN.

Fort DuPont, Del.

—The asbestos would undoubtedly be better for the purpose. The repair, however, is merely intended for use at such a time as when poor compression develops on a tour where it would be inconvenient to stop long enough to secure parts. Should the asbestos be at hand, it would be much better. Any thin gasket material would do if carefully applied.

Cylinders Fire Out of Time

Editor THE AUTOMOBILE:—Kindly shed some light upon the following matter: My ignition apparatus, a Kingston coil with La Coste timer, four-cylinder type, suddenly went wrong. The cylinders should fire 1-3-4-2. Instead, I suddenly found No. 2 cylinder firing while No. 1 vibrator spring was trembling, and so on with the other cylinders. Consequently the spark came one-quarter turn too late for each cylinder. The sparks did not occur when the piston had just reached the highest point but when it had gone, I judge, half-way. The motor stopped and ran feebly. What do you think is the matter with it?

Baltimore, Md.

J. F. RUPPELL.

—The trouble is that the timer has rotated on its shaft for a quarter turn, putting you one cylinder behind on your firing. As the piston is not in its correct position when the motor fires, hardly any power is developed. If you will look at the sketches of the La Coste timer shown in Figs. 2 and 3, it will be easy to understand the construction of the timer. A central shaft

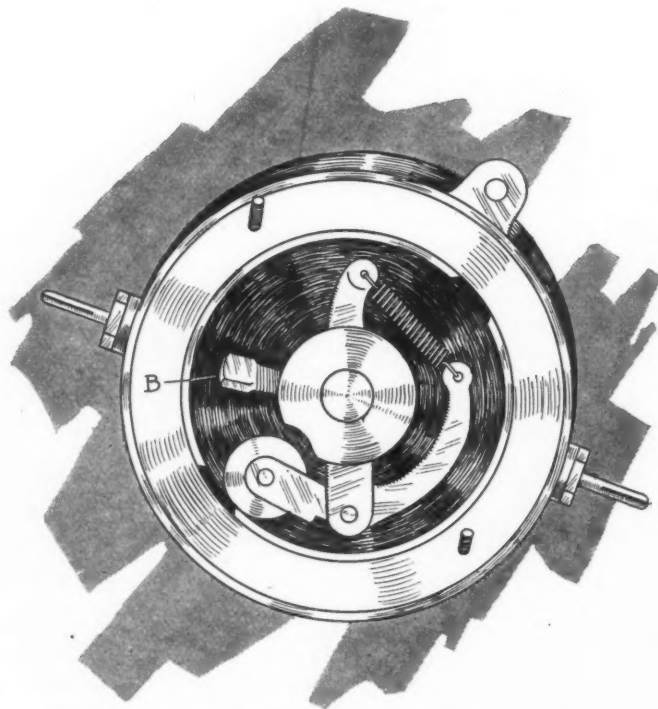


Fig. 3—Looking into La Coste timer with cover removed

runs through the timer casing and is held in its relative position to the sleeve of the casing by the setscrews A and B. The point at which the shaft has slipped around may be at either of these places, or it may be at both. Loosen the screws by turning them back to the left a full turn and turn the timer back in relation to the shaft until the roller will be in contact with the correct point when the vibrator is buzzing. It will probably be easy to find at which point the slip has taken place by trying both setscrews and determining which is the looser of the two. The looser one will show at which point the slip has occurred.

Has Trouble Meshing Gears

Editor THE AUTOMOBILE:—Would you kindly tell me why my car bothers me in the way of meshing gears? When running down-grade I often have to stop at the bottom of a hill before I can shift into low speed. My car is a Flanders 20 and has been run about 1,500 miles.

FRED A. WOOD.

Burke, N. Y.

—That the trouble develops merely when going down-grade shows conclusively that in this case it is a matter of driving and not of any defect in the mechanism of the car. If you will accelerate your motor just a little before shifting you will have no trouble. The car, in going down-hill, has a tendency to go faster than the motor and, in order to get both gearwheels going at nearly the same speed, it is necessary to speed up the motor just before making the change. It is difficult to see any advantage in shifting to low speed at the bottom of a hill, but if you must, the above tip will help.

Wants License Information

Editor THE AUTOMOBILE:—Will you please let me know if a resident of Virginia is exempt from license in the states of Maryland, Pennsylvania, New York, Connecticut, Vermont, New Hampshire, Massachusetts, Delaware and Rhode Island?

I understand that New Jersey issues 8-day licenses for \$1. Can these be obtained in New York City?

S. W. H.

Norfolk, Va.

—As a licensed resident of Virginia you are free to pass through all the states that you mention above. In Delaware, Pennsylvania, Massachusetts and Rhode Island your time is limited, however, to a 10 days' stay, while in Maryland you may make two trips, neither of them to last more than 7 days.

You are mistaken regarding the New Jersey licenses. You can remain 15 days a year in New Jersey without taxation if you are licensed in Virginia. There are no more short-term licenses issued in New Jersey.

Lost Motion in the Rear Axle

Editor THE AUTOMOBILE:—I have an Overland 54 automobile and I want to know if it is practicable to take the lost motion out of the rear axle on the wheel end by closing the bearing sleeve and putting tin around it. The car has run 9,500 miles and the rear drive axles are worn pretty badly. I presume the sleeve and bearings are both worn. The bearings are Hyatt rollers. I would like to get the lost motion out without having to renew everything, drive axles, bearings and sleeves.

(2) Under proper use and normal lubrication, do you think that a rear axle which has been properly heat-treated should show any appreciable wear under 10,000 miles?

(3) How many pounds or ounces of soda should be put in the water to clean out a radiator on the above car? Or how much soda to each gallon of water? I have used a pound to each radiatorful.

S. E. S.

Cobb, Ga.

—(1) There is no chance of making the repair good and lasting according to the method outlined by you. It is impracticable in the first place, because the bearings would be compelled to work in faulty alignment, which would soon cause them to wear worse than ever. The only thing you can do is to disassemble the parts and note which are worn and replace them by new ones.

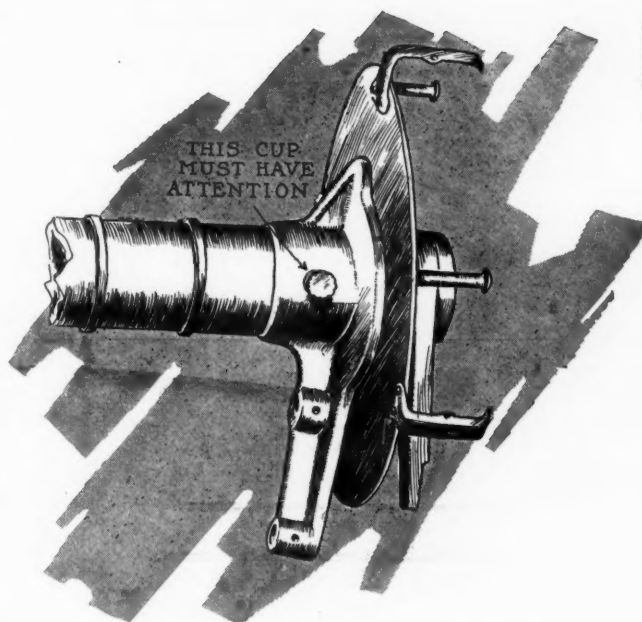


Fig. 4—Grease-cup on the Overland car axle

(2) A rear axle should not wear seriously in this length of time. The probabilities are that during the first thousand miles or so the lubrication was not as well taken care of as it should have been, and, as a result, the wear was started at that time. The grease-cup shown in Fig. 4 should be kept full of a good quality of lubricant and should be turned down every 200 miles. If this is neglected, wear on the parts you mention can be expected.

(3) You are using the correct amount of soda.

Wants to Make a Track Machine

Editor THE AUTOMOBILE:—I would like to know the name of a company which can furnish me with flanged wheels so as to convert an Oakland 40-horsepower car into a track machine. The gauge would have to be standard railroad gauge. Have you any data on a change of this kind?

Do you think it necessary to have a spring on steering rods so as to straighten wheels after rounding a curve?

Marble, Col.

FRANK GERTIG.

—Such a wheel is made by Goodman & Company, of Bucyrus, O., who would be able to give you full data regarding the change. It would seem to be an advantage in having a spring to turn back the wheels after rounding a curve so that in case there is a tendency for one of the wheels to be out of line it would be corrected by the spring.

Gives a Tip on Vulcanizing

Editor THE AUTOMOBILE:—A good way of using an electric vulcanizer is to jack up the wheel, place the vulcanizer between the ground and the tire that is to be repaired and then slowly lower the jack until the desired pressure is obtained between the tire and the vulcanizer.

If the floor is of concrete it would be a good plan to place a board or some other insulator between the vulcanizer and the floor, because concrete conducts electricity and most electric light circuits are more or less grounded.

Allegheny, Pa.

MURRY FAHNESTOCK.

[THE AUTOMOBILE is holding a few queries and communications which have been received unsigned. If a correspondent does not wish his name published it is merely necessary to state this fact in the letter and a *nom de plume* will be substituted. As an evidence of good faith, however, it is required that all communications be signed.—EDITOR.]

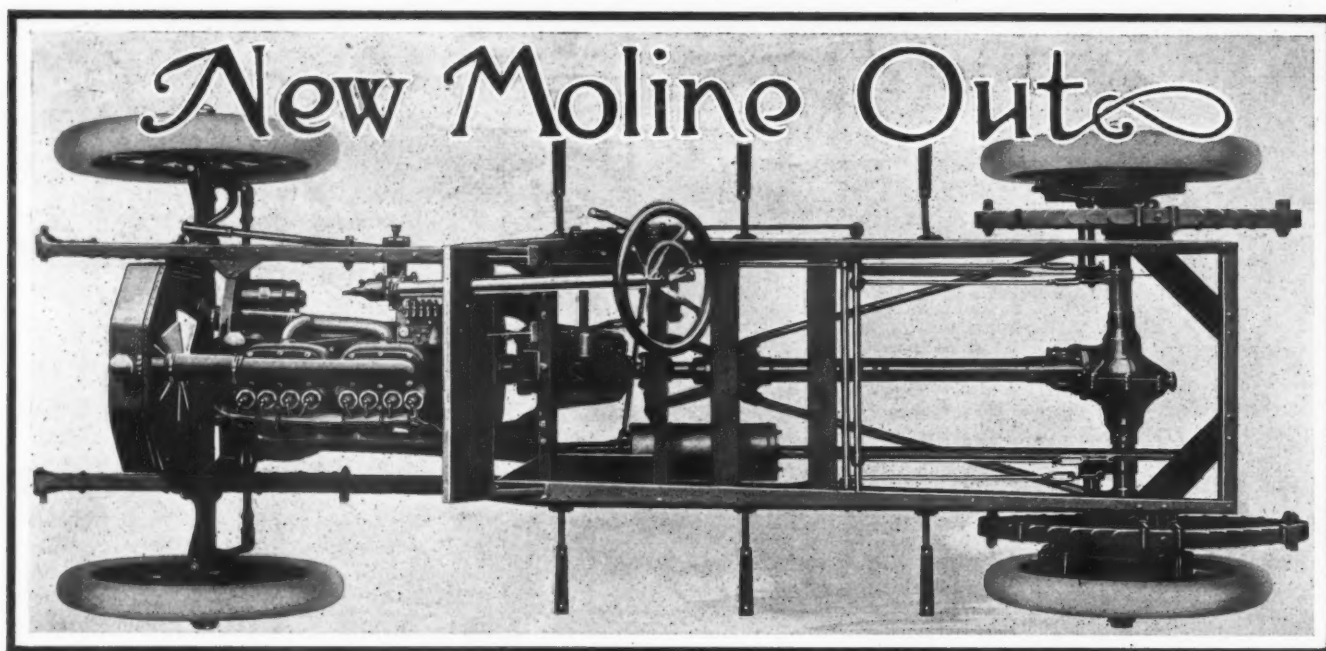


Fig. 1—Plan view of new Moline chassis, to be known as model M-40

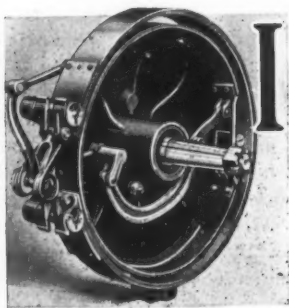


Fig. 2—Brake interior

IN the 1913 Moline car, which is to be known as model M-40, there will be noted an increase in the bore of the cylinders, an increase in the wheelbase, a greater drop to the frame, gasoline tank placed on dash and the installation of the Ward-Leonard lighting system. These changes mark the introduction of the new model Moline. The car which has heretofore been distinguished by the fact that it had the greatest stroke-bore ratio of any of the American cars still remains among those having the greatest ratio, although it no longer has the highest.

The motor is rated by the makers at 40 horsepower, which should be conservative, considering the bore of 4 1-8 inches and the stroke of 6 inches. Last year the stroke was also 6 inches but the bore for the 1912 cars was only 4 inches, giving a stroke-bore ratio of 1.50 as against 1.45 for the 1913 cars. There are four cylinders cast in blocks of two each. The valves are all located on one side

of the motor, the cylinder castings being of the L-head type. The valves, however, are fully inclosed. The motor is shown in Figs. 3 and 5. The inclosed valve construction is shown in Fig. 3, which illustrates the right side of the motor. The simple water manifold casting may also be seen in this view. In Fig. 5 the front and left side of the motor are shown. The carburetor is hung high, being 5 inches higher than last year, following the general 1913 practice in this respect that is tending to get everything where it may be reached by lifting the hood.

Remarkably few projections are noted on the exterior of the crankcase, unit construction and what may be called a modified threepoint suspension being used. The front end of the motor is hung from a cross-frame which is bolted to arms at the top of the crankcase, as may be seen in the chassis view, Fig. 1. The rear of the crankcase is bolted to the clutch and gearset housing so securely that practically a single housing may be said to exist for the crankcase clutch and gearset. At the rear end of this housing a rigid connection is made to a heavy transverse sub-frame forming the other support for the motor as well as for the clutch and gearset.

The pistons are 4 3-4 inches in length and have four rings, the lowest of which is in the same plane as the center of the wrist pin. The other three rings are distributed evenly between the center of the wristpin and the top of the piston. From the center of the wristpin bearing to the center of the crank bearing the connecting-rods are 12 1-8 inches in length. The lower connecting-rod bearings are 2 1-4 inches in length and 1 3-4 inches in diameter. The wristpin bearings are 2 inches in length and 7-8 inch in diameter. There are three crankshaft bearings, all of which are babbitt-lined and of good length. At the fly-wheel end there is a 3-inch bearing. The diameter of the crankshaft is 1 3-4 inches.

Thermo-Syphon Cooling System

THE cooling of the motor is effected by the thermo-syphon system. The manifolds are of large size and slope straight from the radiator to the waterjackets. The absence of a water pump leaves the designer free to place the magneto very close to the gear from which it is driven at the forward end of the motor. The magneto is of Splitdorf make, a double independent system of ignition being used. One set of spark-plugs is connected to this magneto while a second independent set of plugs is wired to a distributor, battery set and coil. Spark advance is controlled in the usual manner from a lever on a

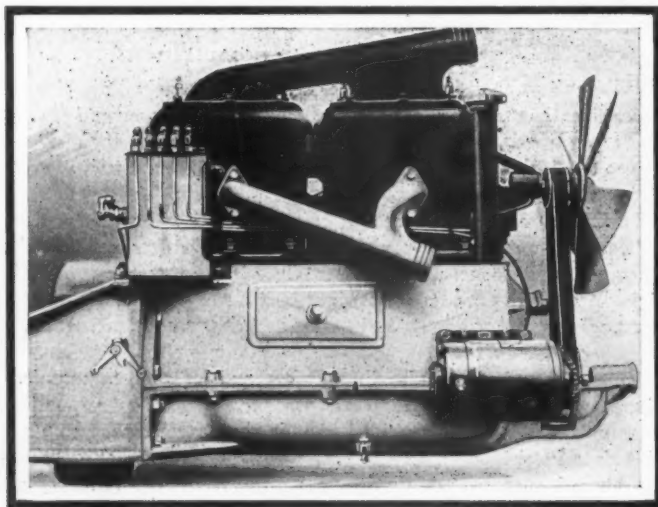


Fig. 3—Right side of the Moline long-stroke motor

quadrant located on the steering wheel. Directly opposite the magneto on the other side of the motor is located the lighting dynamo. This is driven by a silent chain off the same wheel which drives the fan belt. The construction is shown in the front view of the motor, Fig. 5. As may be seen, there are no long shafts outside the crankcase, the absence of a water pump accounting for this. The installation of this dynamo is new this year and it has been accomplished in a way that takes but little room and has not altered the construction in any respect except to change the wheel from which the fan belt is driven. This should render it very easy for owners of previous Moline models to get the dynamo installed on their cars should they so desire. All six lights are taken care of by this installation.

The lubrication of the car is a combination of the force-feed and splash systems. The oil pump, which is driven from the camshaft, takes the oil from the crankcase reservoir and delivers it under pressure to the rear main bearing, the front main bearing, all four cylinders and the timing gears. After lubricating these points, the oil drains back to pans in the crankcase where the connecting-rods are allowed to dip in them for a very short distance, forming a spray which aids in the lubrication of the cylinders and also takes care of the central main bearing, the camshaft and the cam followers. After having reached a certain level in the crankcase the oil drains back into the lower part of the crankcase where the reservoir is located. There is a screen located between the reservoir proper and the oil pump through which all the oil passes on its course. None of the impurities gathered by the oil after having circulated through the system are allowed to pass into the pump.

Clutch Is Fitted with Cork Inserts

The clutch is a conventional leather-faced, cone type, situated in the flywheel, the diameter of which is 16 inches. In order to make the engagement easy and to safeguard the clutch against fierceness, cork inserts are used. The adjustment of the clutch spring is effected by means of a large nut located off the end of the shaft passing through the center of the male member of the clutch and also through the axis of the spring. Turning to the right increases the tension on this spring. Lubrication of the clutch is effected by a grease-cup located on the male member.

The gearset is of the three-speed type, working upon roller bearings throughout. The gearset housing is separated from the clutch housing by means of a stuffing-box, there being no passage of lubricant between the gearset and the clutch, thus guarding against oil reaching the face of the clutch and causing slipping. A similar stuffing-box with metallic packing is placed

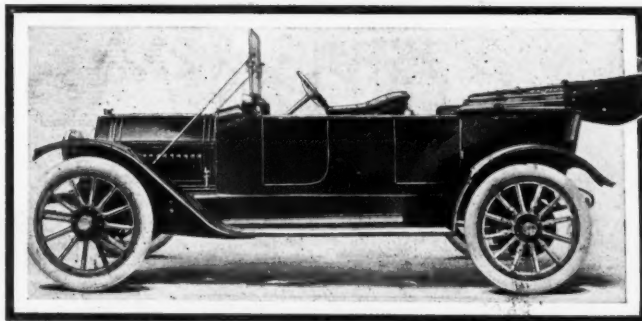


Fig. 4—The five-passenger touring Moline Dreadnought

at the other end of the gearset housing to prevent leakage in this direction.

The drive is taken up through a universal joint at the rear of the gearset and passes through a propeller shaft to the bevel gear rear axle which has been made larger. The front axle is of I-beam section and carries the wheels on large-size ball bearings. The brakes have been increased, in size, being now 16 inches in diameter instead of 14 inches and the width is now 2 1-2 inches instead of 2 inches. The springs remain the same, being semi-elliptic front and scroll elliptic rear.

A radical change has been made in the gasoline system, two tanks being used. The first is located in the dash and has a capacity of 8 gallons, while the other is under one of the front seats and has a capacity of 12 gallons. This arrangement allows the carburetor to be hung higher, as noted above.

Other features in this model which are worthy of note are: The marked increase in the wheelbase, 10 inches being added, which brings it up to 124 inches; to add to the easy riding qualities of the car, the upholstery has been deepened and Turkish back springs added; demountable rims are included in the regular equipment; right side control is retained but a change in the appearance of the car has been effected by leaving the toolbox off the running-board and placing it under the floor of the tonneau.

Two styles of body are listed, a five-passenger touring car and a roadster. By making the tonneau of the five-passenger car very roomy it is made possible to fit auxiliary seats if desired. Both styles of body have fore-doors which are designed so that all of them can be opened. Any of the doors can be hooked ajar for purposes of ventilation.

In addition to the electric lighting system, comprising six lamps, dynamo and storage battery, the standard equipment includes a self-starter and a one-piece glass windshield.

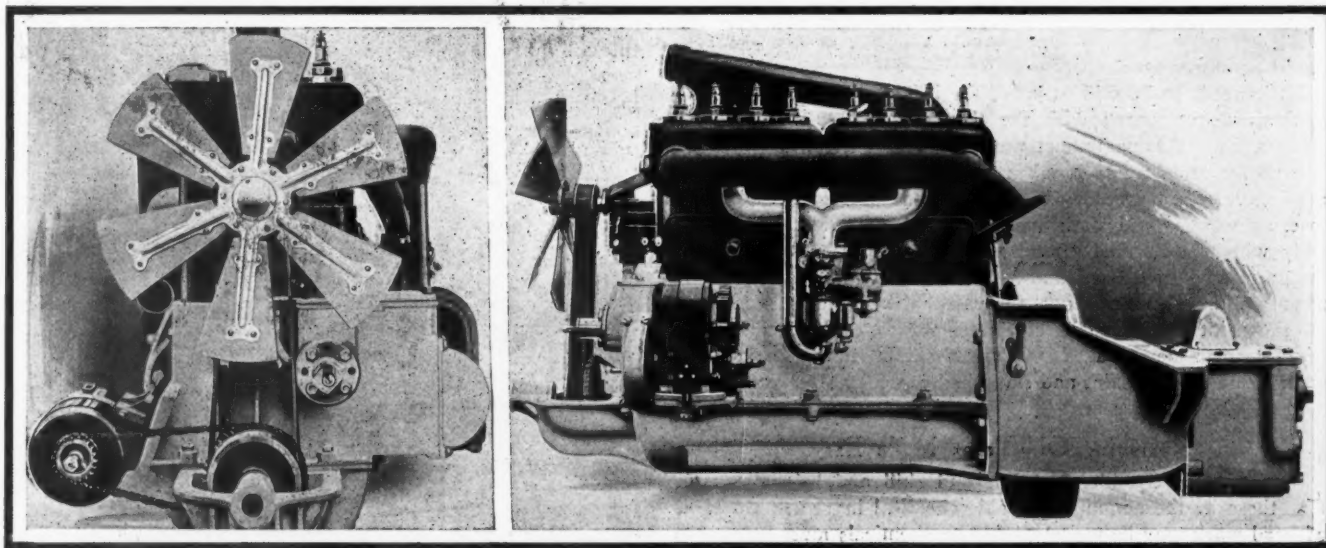


Fig. 5—Front and left view of motor employed in the Moline M-40 cars, showing lighting dynamo attached

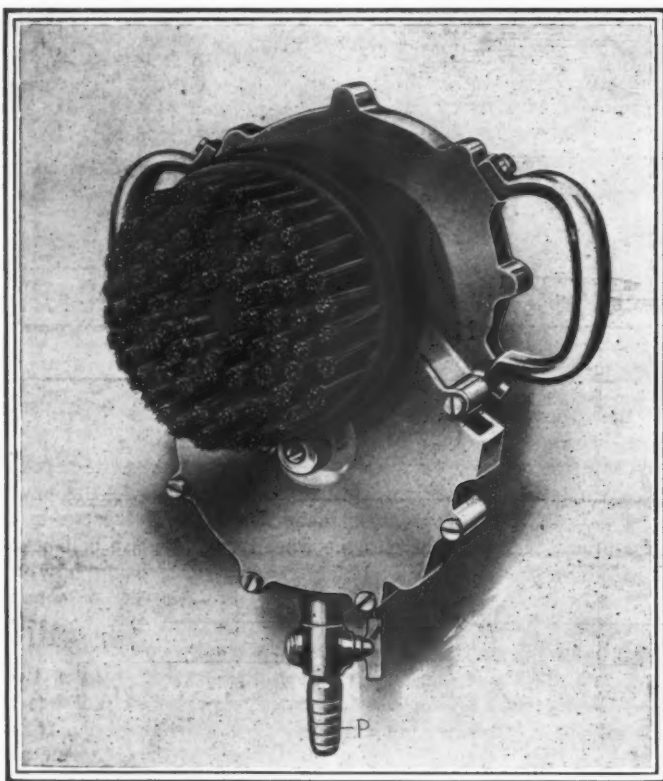


Fig. 1—Tough wire brush operated by compressed air motor

Removing Old Paint

Modern Practice Demonstrates Efficiency of Dissolving Coat With Chemicals Instead of Scraping or Burning

Liquid Can Be Applied by Compressed Air Method and Surface Cleaned by Vacuum Suction

CLEANING the body of the old paint before covering it with a new coat is a necessary and not too easy operation. There are several methods of accomplishing this end. These consist in either scratching or burning off the old paint, or removing it by the chemical action of a specially prepared paint-remover.

Little needs to be said to prove the inferiority of the first two methods as compared with the third one. The chance of a wooden body passing unhurt through the process of scratching, even if the utmost care is taken, is small. Burning off the paint requires a high degree of expertness on the part of the operator, where a wooden body is being worked upon, while even a metal body will be deformed except under adept treatment. Despite the great amount of care and skill required to do a good job by means of these two methods, the work of burning or scratching off the paint by no means completes the task of preparing the surface for a new coat, for it must still be cleaned of the remainder of the old paint and smoothed carefully so as to prepare it to take on a new coat.

Removing Old Paint Made Easy

All this takes considerable time and skill and by supplanting these by the action of suitable chemical ingredients a piece of hard work may be made easy. The chemicals must be able to dissolve the binder holding the paint to the surface coated with it, this binder consists, in practically all cases, of some sort of oil.

Therefore, the chemical must dissolve the oil and thereby rob the color of its base, leaving it on the body surface "without a leg to stand on" and ready to be removed easily and quickly by suitable mechanical means.

One of the chemicals having the power of dissolving oil, and therefore of taking the paint off its base, is acetone. The principle of loosening the paint from the surface to which it was formerly applied is the same as that of loosening carbon deposits in cylinders from the walls to which they are held by baked products of decomposition of the cylinder oil.

Chemical varnish removal is a process which varies widely according to the appliances used in carrying it out. With suitable apparatus the work of cleaning surfaces can be done in a very short time and with an ease unknown to the great number of paint shop men.

Liquid Applied by Compressed Air

Among paint-removers, the product of the Wilson Remover Company, 30 Church street, New York, is characterized by its composition, which results, after application, in a thin and slippery mixture of solvent, paint, varnish and shellac. This does not stick to the surface, but may be easily removed therefrom. The remover comes in bottles and cans of various sizes and may be applied by hand where small articles are to be stripped of the paint covering them. In the case of large objects, such as automobile bodies, the automatic method illustrated in Fig. 2 will prove superior. This method uses a tank in which remover liquid is kept under the pressure of compressed air. A pipe, the open end of which is submerged in the remover liquid, extends through the wall of the vessel and there is fitted with a hose to the end of which a spray nozzle is attached. The compressed air may be supplied either from a tank or by pumping air into the vessel. If the valve governing the outflow of the liquid through the hose is opened, the air forces the remover through the hose and nozzle, where it is sprayed and mixed with air, the mist being directed against the surface to be cleaned of paint.

The remover striking the surface of the paint immediately begins to attack the oil which binds the color to the body sur-

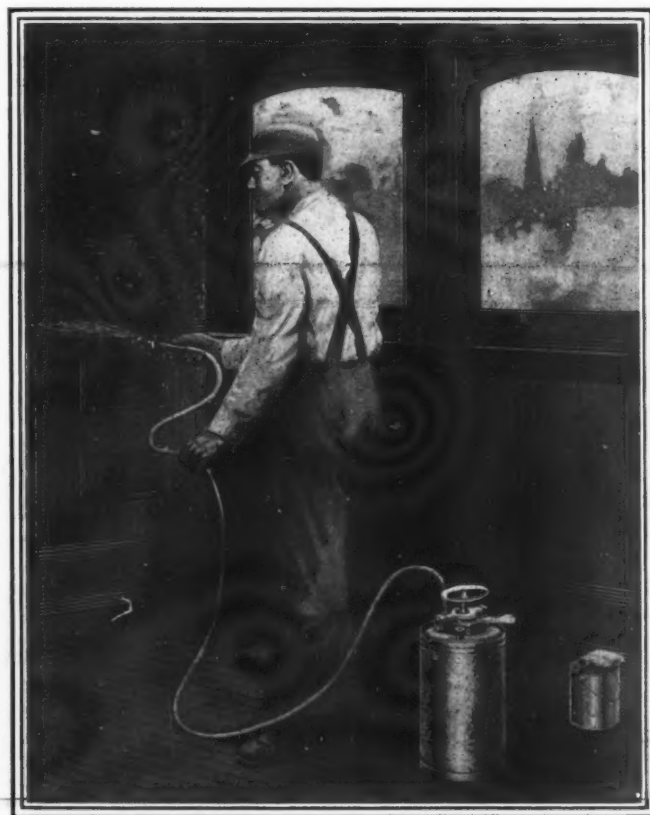


Fig. 2—Applying paint remover by compressed air through a nozzle



A car built for fording streams, when necessary, in the African colonies is tried out in a slip of the Seine

face and transforms it into a thin, jelly-like emulsion which may be removed by means of the motor brush, Fig. 2. The latter consists of a series of small wire brushes mounted on a holder which is carried by the shaft of a small compressed-air motor M. When compressed air is admitted through the pipe P, the pressure being regulated by means of the cock C, the brush holder is thrown into violent rotation and can be made to go as fast as 2,000 revolutions a minute. As the brush is rotated and moved along the surface which has been treated with the remover it sweeps off the gelatinous emulsion covering the body, rendering it ready for the immediate application of a new coat of paint.

Cleaning Surface by Vacuum Suction

Naturally, the use of paint remover and of the special accessories is not limited to the cleaning of automobile bodies; it may be used on any surfaces which are to be repainted, whether they are of wood, steel or aluminum. In some cases, especially where metal surfaces are being cleaned, the emulsion of remover, paint and varnish may be more advantageously taken off the surface by means of a vacuum suction cleaner, which is also operated by compressed air passing through a nozzle. This type of cleaner is specially suitable where a high-pressure air compressor is at hand and is even easier to manipulate than the brush, since it has no moving parts. Like the other appliances just described it is made by the Wilson Remover Company.

The process of paint and varnish removing described above marks one step toward the modernization of the painter's business, which has hitherto not been very up-to-date as far as standardization of effort and efficient, quick operations are concerned. As the tendency to get away from operations subject to the personal equation is growing in the automobile industry, there is hope that the paintshop, too, will be invaded by more efficient lines of practice and that, in not too remote a future, painting, like paint removing, will be done on a more or less machine-controlled basis.

To Lighten Metallic Construction—In an exhaustive analysis of the means for constructing as lightly as possible, G. L. Gerard, while referring especially to civil engineering, emphasizes a simple general principle which applies to automobiles as well and is sometimes ignored. It may be expressed: Avoid any design involving the use of parts which are not loaded to the chosen safety limit. For practical reasons, the underloaded parts usually have to be of the same dimensions as if they supported their share of stresses. This rule excludes parts which are mainly under bending stress. In many instances a saving can also be effected through the observation that the maximum stresses of different kinds to which a part may be subjected are never simultaneous.—From *La Technique Moderne*, issue of June 1.

An Amphibious Car

Charron Builds Automobile Specially
Designed for Service in Africa
Where Bridges Are Scarce

Interesting Method of Keeping Motor Going While Under
Water—Details of the Test

IN THE European colonies in Africa bridges are not abundant, and the automobile which fords a little trickling stream in the sunlit morning is likely to find on its return trip in the afternoon a wide stretch of bottom land inundated with the drain from the adjacent veldt. It is for this condition, which may be duplicated in this country without going far away from the arteries of traffic, that the Charron firm of France has built a few vehicles capable of operating under water long enough to meet a travel-emergency. The illustration shows one of them emerging from the river Seine after a ducking. It is a shaft-driven car with only 10 inch clearance under the front axle, though chain-drive and more ample clearance would evidently be better for rough colonial travel. The provisions for keeping the motor going under water are more interesting, though it should be mentioned that the cone clutch has given no trouble. The exhaust pipe is prolonged by means of a hose and tube turned upward at the rear of the car and secured in that position, so as to have the burnt gases escape into air, as shown in the pictures. This extension pipe is only attached when needed. The magneto is enclosed in a tight steel casing. In the monobloc motor with valves on one side the spark plugs are screwed into the admission valve housings and are covered with an inverted sheet steel gutter secured by a tight joint to the cylinder block. A tube containing the wires connects the gutter with the magneto housing. The carbureter is encased in the same manner as the magneto, and a tube is raised from this casing to the atmosphere, extending to the height of the driver's face. The air vents of the crankcase are corked up when the car goes into water, and it has been found that this provision causes no inconvenience in the operation of a four-cylinder motor in which the volume of air space in the crankcase is not affected materially by the piston movements. On the other hand it has been found necessary that the compression should be irreproachable, so that no pressure from the burnt gases shall find its way to the crankcase and accumulate there.—From *La Vie Automobile*, June 22.

The latest estimate as to the world's product of gasoline is at the rate of 2,000,000,000 gallons per year.

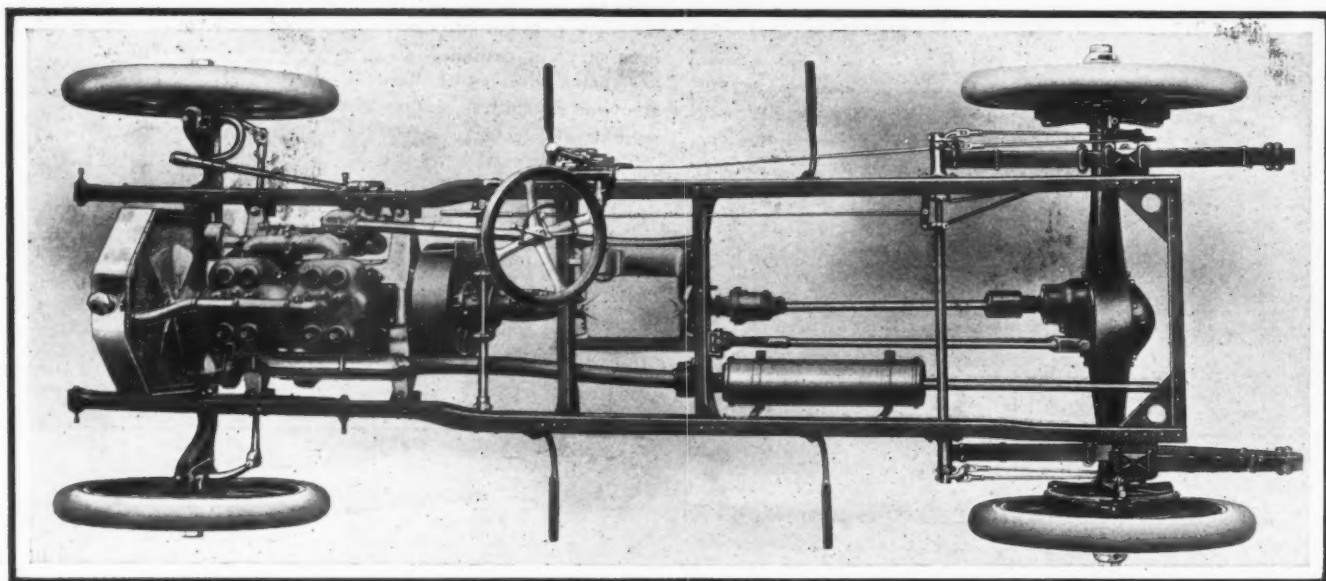
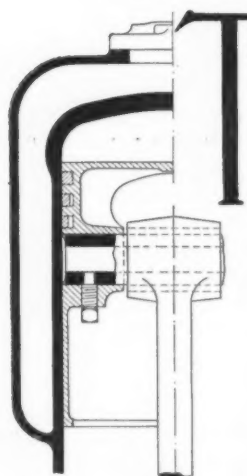


Fig. 1—Chassis of the Pullman model 4-44, embodying the improvements adopted on the 1913 line

Three Pullmans

Company's Line for 1913 Will Include Two Four-Cylinder and One Six-Cylinder Models

Easy-Riding Qualities Enhanced—Silence of Operation Secured by Superior Workmanship



Section through motor, 4-44

notes, giving a product that each year takes a step in the direction of ultimate perfection. Greater comfort for the driver and the passengers is also made an aim, as is shown by the greater ease of control and increase in easy-riding qualities.

For all three models the following changes will be noted: Larger radiators, lighter wrist pins, dash carbureter primer for easy starting purposes, larger steering wheel and longer springs both front and rear. Besides these changes there are several others which have been made on the two larger cars only, that is the 4-44 and the 6-66. A new crankcase bottom pan has been

THREE models of Pullman automobiles will be on the market for 1913. They will be known as the 4-36, 4-44 and 6-66. The first number in each case refers to the number of cylinders, while the second refers to the rated horsepower. There were four models built under the 1912 date and these were known as models 4-30, 4-40, 4-50 and 6-60. The 4-50 has been dropped for 1913 as a regular model and the other three have been continued with modifications, but under the new names just mentioned. The principal changes which will be noted in the new line of cars seem to follow very closely along the lines of the trend in modern automobile engineering practice. Better materials and greater accuracy in manufacture are the key-

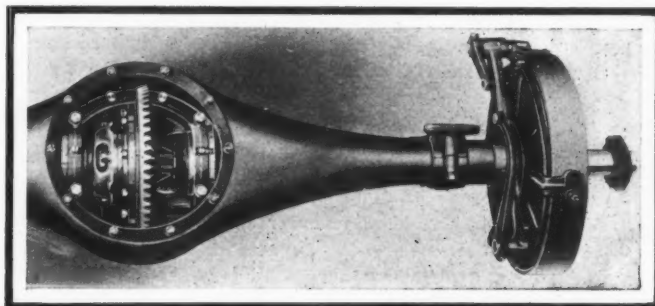


Fig. 2—Rear axle and brake with differential cover plate removed

added to these two models, giving an increased oil supply; an extra bearing has been added to the camshaft, pump and magneto shafts, giving a stiffer support and reducing wear. This has been accomplished by altering the shape of the timing gear case to make it support the extra bearing. An arrangement is added whereby the level of the oil in the crankcase is under the control of the driver from his seat, a regulating device having been placed on the dash. A larger flywheel has been placed on both these models, an increase of diameter of 2 inches having been made. The gearset has been entirely redesigned and an extra bearing added to the dog clutch. An electric lighting generator driven by chain is also a feature of both cars, while on the 6-66 alone there are embossed yokes on the rear wheels.

Motor Parts Interchangeable

The motors on all cars have cylinders cast in blocks of two. The only difference between the six-cylinder car and the larger of the two four-cylinders is that the six-cylinder has an extra block of two cylinders and of course has the necessary added features of a six-cylinder car. The bore and stroke are the same, and throughout wherever it has been possible the parts of the two motors are interchangeable. This is true throughout the Pullman line. The interchangeability of parts has been made a feature, so that manufacturing costs, which are always high where several models are made, have been reduced to a minimum. The valves throughout all the motors for instance are the same both for the exhaust and intake sides. They are all 2 1/8 inches in diameter and have a lift of 5/16 inch. The bore and stroke of the 4-36 are 4 1/16 and 5 inches, respectively, and for the 4-44 and 6-66 the dimensions are 4 1/2 by 5 1/2 inches. The horsepower rating on all models is taken at 1300 revolutions per minute.

All motors are of the T-head type with the valves enclosed. Cover plates are fitted over the valve mechanism on the sides, preventing leakage of lubricant and giving a neat appearance. The material of the valves is nickel steel for the heads, while the stems are made from machine steel. The joint between the head and stem is made by the electric welding process. The pistons are made of the same grade of gray iron as the cylinders and are ground with a taper at the top, while from the lowest ring down they are straight-sided. The pistons and cylinders are hand-lapped after assembling on all models to secure the best possible fit. The compression on all models is about 60 pounds to the square inch. The connecting rods are I-beam in section and on the two larger models 11 3/4 inches in length.

Splash Lubrication Employed

The motors are lubricated by splash. On the two larger models the oil is delivered from an eccentric pump which is driven by spiral gears from the camshaft to the oil troughs and also to the timing gears in the front of the case. The oil is splashed to all the bearings by the lower end of the connecting rods, which dip far enough into the oil contained in the troughs below the throw of each to create a spray which pervades the entire crankcase and takes care of the cylinders as well as all the bearings contained within the crankcase. After the camshaft, crankshaft and timing gears have been lubricated, the excess oil flows back through drains into the oil reservoir, which is located in the bottom pan or lower part of the crankcase.

The dash adjustment feature, which is prominent on the 1913 Pullman cars, allows the driver to change the point at which the overflow from the upper to the lower part of the crankcase takes place. The oil pump continually delivers oil faster than it is used and the oil is kept up to the level of the hole in the drain. The part containing the drain hole can be raised and

lowered by the device shown in Figs. 6 and 7, thus enabling the driver to supply more oil on a stiff pull than would be necessary on ordinary straight roads or city work. The redesigned crankcase of the 4-44 and the 6-66 has brought the oil-carrying capacities of these two up to 11-2 and 21-2 gallons, respectively. The oil capacity of the 4-36 is 2 gallons.

The oiling system of the 4-36 is very much the same as that employed on the two models just described. The oil overflow can be controlled, but not from the dash. The control in this case is effected by lifting the hood and manipulating the lever which is located on the upper side of the crankcase. Another distinction is that there is no oil lead to the timing gearcase on the 4-36. The timing gears are lubricated by grease in this model.

The cooling system remains unchanged since last year. On all models a centrifugal pump is employed which is positively driven by gear from the crankshaft. The width of the water-jacket is 5-8 inch around the cylinders and the thickness of the metal in the jacket is 3-16 inch. The metal in the cylinder is thickened at the combustion space so that an increased width in the water-jacket is necessitated by it. From 1-4 inch on the walls the thickness bulges out at the combustion chamber to 3-8 inch. This gives an added strength at this important part, but renders the cooling duties of the jacket more difficult, a situation which is met in the Pullman cars by a corresponding increase of sectional jacket area on the cylinder head.

Better material is a feature in the building of the engine. Instead of the ordinary chrome steel, nickel steel bolts are being used throughout the motor on the 1913 cars. All the shafts are ground with a limit of tolerance of .00025 inch. This limit is strictly adhered to in the case of all the shafts and pins, blocks and bearings of the universal joints. Formerly a plain finish was used on many of these parts, mere machine work being made to suffice where grinding is now required by the maker's specifications. Interchangeability here also finds a field, for the cam contours are the same for all models. A rounded form of cam is used, giving a fairly quick opening and closing without the shock, side thrust and consequent wear of the square-sided cam.

Accuracy to Insure Silence

No special means of insuring silence have been taken beyond good workmanship. It is the belief of the engineers of the company that where accurate workmanship is made a study, silence will come of itself. All the proven methods of construction have been incorporated. In the timing gearset spiral gears are used which are especially hardened through a heat-treating process given them at the Pullman factory. The gears are of the spiral type and are cut slightly below the finished pitch, the heat-treating process being of such a nature that after completion the gears have expanded slightly. In order that the

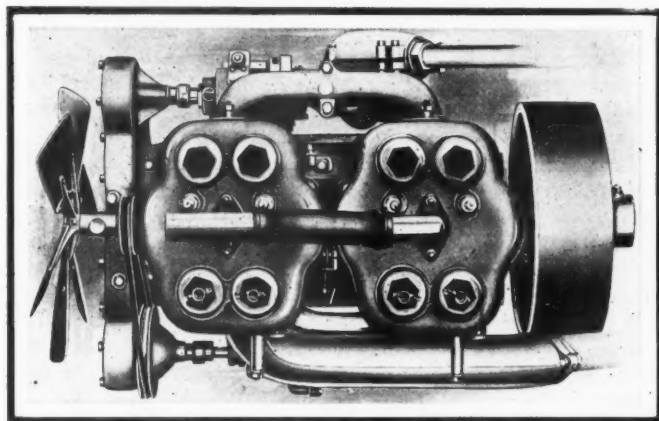


Fig. 3—Looking down on top of the 4-44 Pullman motor

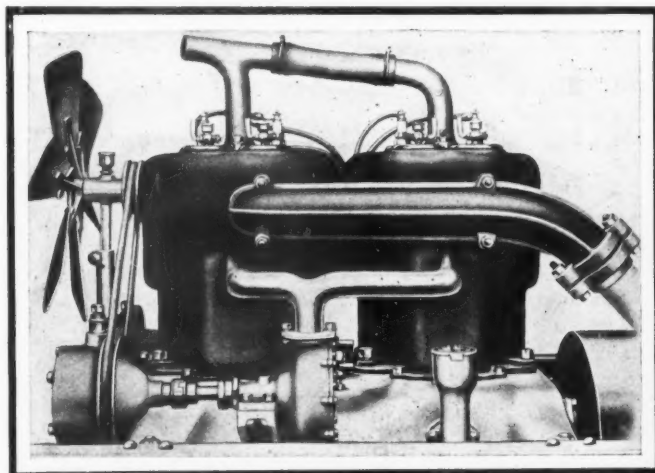


Fig. 4—Left side of motor, showing arrangement of manifolds

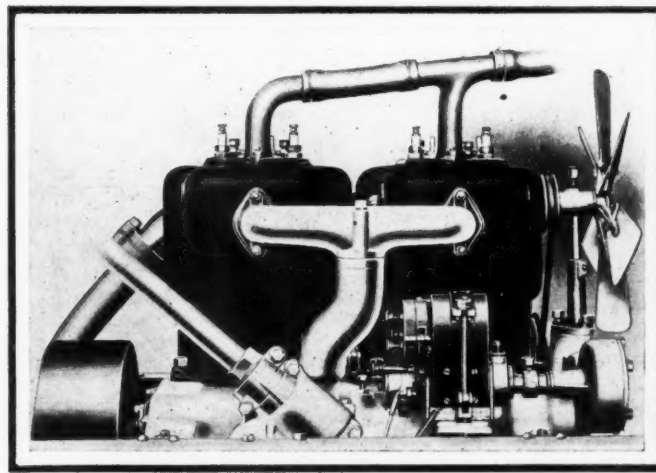


Fig. 5—Right side of the same motor, showing magneto and intake

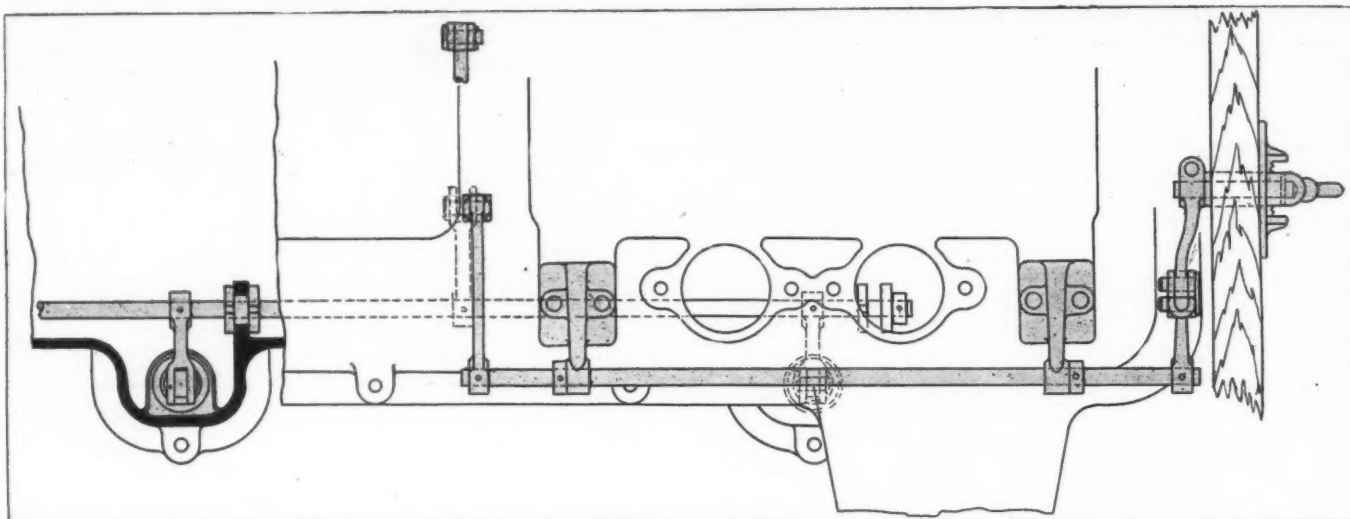


Fig. 6—Plan view of the new oil level adjusting device fitted to the model 4-44 and 6-66 Pullman cars for 1913

gears do not lose their shape while passing through the heat treatment they are packed in a sandy compound and enclosed in a cast iron air-tight case. They are given a permanent set in this treatment and can then be given the oil treatment without danger of warping under the internal stresses due to the heat.

The ignition system is the Bosch dual on all three models. The magnet is driven by a short independent shaft and is located on the opposite side of the motor from the water pump. The gasoline system remains the same as last year, there being no change in the tank capacities. The smallest car, the model 4-36, can carry 15 gallons of gasoline; the 4-44 has a capacity of 18 gallons and the 6-66 has a tank which will carry 25 gallons. Figures on fuel economy have not been compiled officially, but on a quick trip from the factory in York, Pa., to Washington, D. C., and back not long ago one of the factory testers averaged 12 miles to the gallon with the six-cylinder car. The other models would of course give a higher mileage to the gallon.

The clutch fitted on all models is the leather-faced cone type. It is not enclosed, as the aluminum crankcase of the motor stops

at the flywheel. In order that there shall be no leakage of oil around the crankshaft bearing at the rear of the crankcase and no possibility of the clutch becoming oily from this source there is a ring on the end of the crankshaft which catches the oil and throws it by centrifugal force back into the lower part of the crankcase. Behind the ring there is a felt washer to still further protect the end bearing against a leakage of oil. The crankshaft ends in a broad flange to which is bolted the flywheel by means of nickel steel bolts with castellated nuts. The flywheel member of the clutch is of cast iron and has a diameter on the two larger models of 18 3/4 inches as against 16 3/4 inches last year. The engaging member of the clutch is of aluminum with a face width of 3 inches and a mean diameter around the center of the frustum of the cone of 15 3/4 inches. This gives a frictional area of approximately 144 square inches at the clutch and should be ample for any kind of service. Beneath the surface of the leather there is a series of spiral springs which have the feature of being adjustable, as they are fitted on a through bolt which is held at the rear by a nut and lock nut, as is shown in the sectional view of the clutch in Fig. 8. The main clutch spring is adjustable for tension and is contained in a housing surrounding the short shaft on the aluminum engaging member of the clutch. The adjustments for tension on the spring are made by taking up on a stud which enters the shaft fixed to the flywheel member of the clutch. A ball thrust relieves the washer on the end of this stud and permits of its being turned when it becomes necessary to make the adjustment. A drain plug is located on the lower part of the housing which surrounds the clutch spring. Should any oil collect in this housing it may be drained off without trouble by means of this plug.

Details of the Transmission

The gearset of the 4-36 is capable of three forward speeds and one reverse, while the 4-44 and the 6-66 have four forward speeds and reverse with direct drive on third speed. The shifting shaft of the gearset is of the four spline type, while all the moving shafts are carried on annular ball bearings. A clearance of .005 inch is allowed in the gearset for easy meshing, but every part is carefully ground to size so that there is no lost motion in any part of the gearbox. Silence in this important part of the car has been striven for by the use of the best alloy steel and careful fitting. The distance between bearings in the 4-36 model from inside to inside is 7 1/2 inches, while in the 4-44 and the 6-66 this distance is 11 3/8 inches. The drive passes through a 3 1/2 per cent. nickel steel driving shaft into a Timken rear axle on the two larger models, while on the smaller model the axle is made by the Standard Roller Bearing Company. The gear reductions on the different models vary. On the model 4-36 the reduction is 3 1/4 to 3 3/4 to 1; on the 4-44 it is 3 to 3 3/4 to 1 and on the 6-66 it is 3 to 3 1/2 to 1. Pressed steel housings are

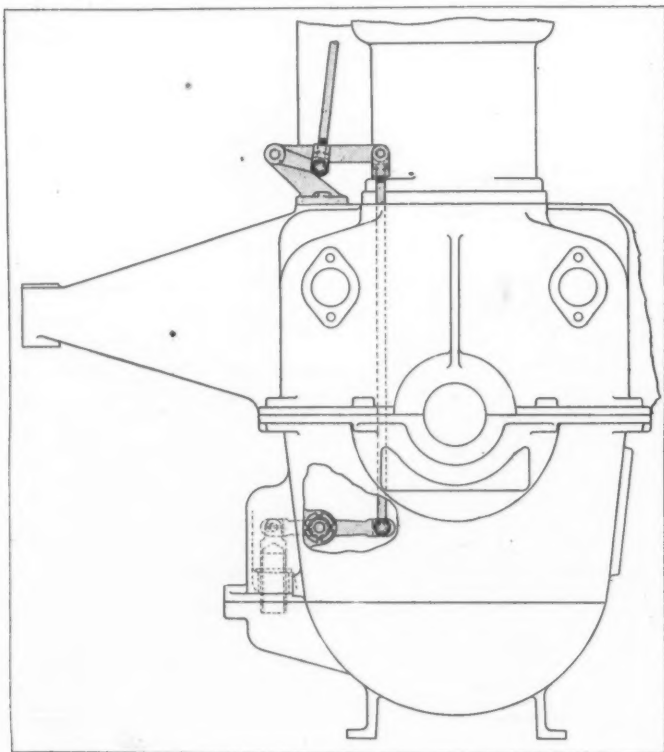


Fig. 7—End view of motor crankcase showing a adjusting screw

used on the rear axle and the bearings are tapered roller in the case of the larger model and annular ball in the smaller.

The brakes consist of two separate sets on all three models. The outfit on the 4-36 is made up of a set of internal expanding metal-shod brakes and a set of external contracting brakes with a Thermoid lining. The brake drum is 14 inches in diameter and the width of the drum is 2 inches. The service brakes are operated by pedal and the emergency brakes in the usual manner by a lever at the side of the driver. The brakes on the 4-44 are exactly similar except that the dimensions of the brake drum are different, having a diameter of 16 inches and a face width of 2 1/4 inches. The brakes on the 6-66 are also of the above description, but have a 17-inch diameter and a 2 1/2-inch width of face.

The wheels on all the Pullman models are the ten-spoked artillery type all around. On the model 36 they are 34 inches in diameter, on the 4-44 and 6-66 they are 36 inches in diameter.

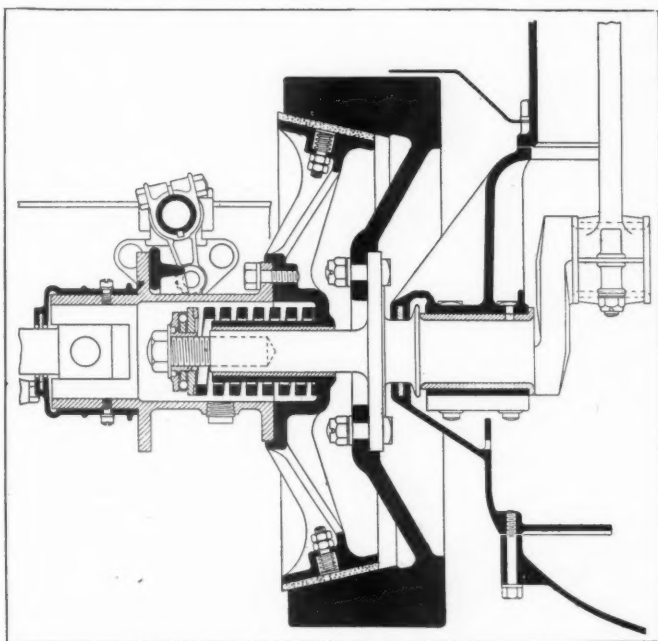


Fig. 8—Sectional view through the leather-faced cone clutch

They are all fitted with Universal quick detachable demountable rims and on the four-cylinder cars with 4-inch tires. On the six-cylinder car the tire equipment is 4 1/2 inches front and rear. The front wheels on the 4-36 run on ball bearings, while on the two larger cars the bearings of the front wheels are of the tapered roller type.

The steering gear and control are on the right side of the car.

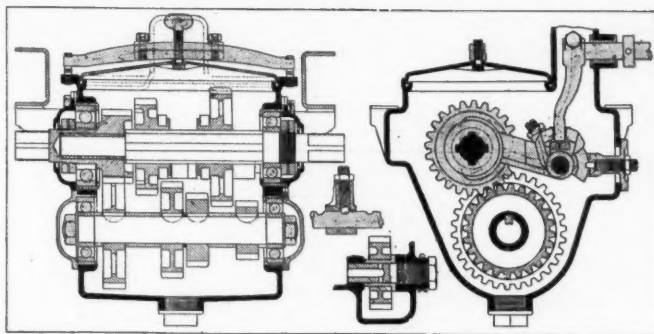


Fig. 9—Gearset of Pullman 4-36, transverse and longitudinal views

The Pullman company has not made any changes in this direction and all the cars are so equipped. The steering gear on all cars is a worm and sector of the semi-irreversible type. The steering knuckles are of the Elliott type. Another feature of all types of Pullman cars is the increased size of the steering wheels. They are now respectively 18 and 19 inches in diameter, the first figure applying to the two four-cylinder cars and the second relating to the six-cylinder.

Suspension, Body and Equipment

The frame is of channel section and is of pressed material. The motor is hung by four brackets which are deep enough to give the required stiffness. The springs are all semi-elliptic in front and 3/4 elliptic rear. The present length of these is considerably in excess of what it was in the 1912 models. The lengths are now as follows: On the 4-36, 40 inches front and 47 inches rear; 4-44, 40 inches front and 47 inches rear, and for the 6-66, 42 inches in front and 54 inches rear.

The bodies are also manufactured at the Pullman plant and are made of metal and wood. The regular body on the 4-36 is a five-passenger fore-door touring car, but on request any other type of body that the purchaser desires will be made and prices quoted on same. On the 4-44 the regular body is also a five-passenger fore-door touring car. The 6-66 has for its regular equipment a body of seven-passenger capacity, but it is also subject to the buyer's wishes in the matter of body style. The tread on all the cars is 56 inches and the wheelbases are 118, 122 and 138 inches for the 4-36, 4-44 and 6-66, respectively.

The equipment for the 6-66 model includes a self-starter which is generally of the Ever-Ready type, although other styles may be fitted by agreement with the manufacturers. A complete electric lighting outfit is also included, along with top, top boot, windshield, speedometer, horn, tools, tool box, robe, coat and foot rails, pump, jack, repair kit, portable electric vulcanizer, tire irons and quick detachable rims. For the 4-44 the same equipment minus the vulcanizer is offered, while for the 4-36 the lighting outfit is adapted for gas.

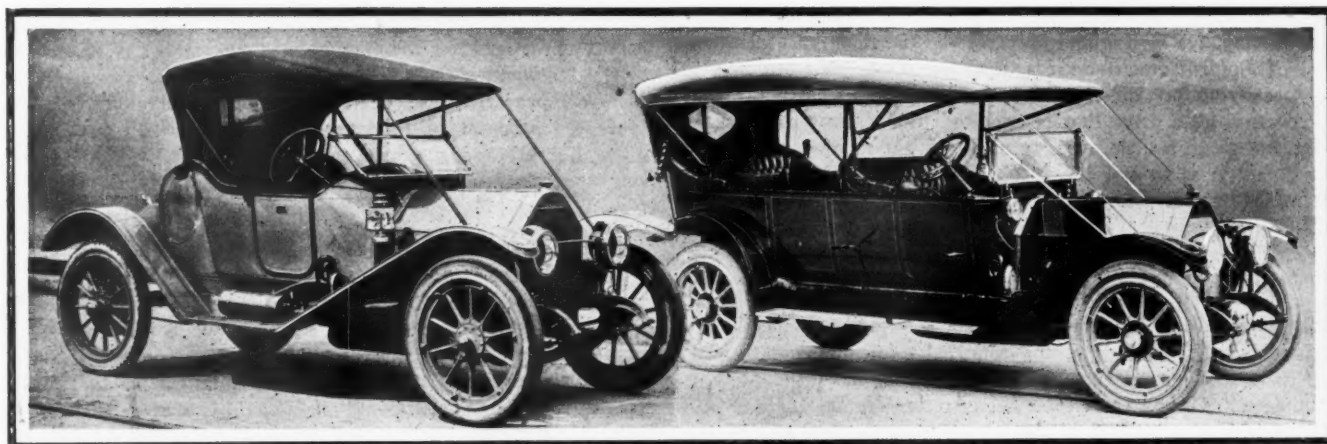


Fig. 10—Pullman Speedster 4-44 and the seven-passenger touring car which is standard on the 6-66 chassis

Late News of the Trade

Ford Company Has Purchased an Entire Block in San Francisco for Its Coast Factory

SAN FRANCISCO, July 13—A block in San Francisco has recently been purchased by the Ford Motor Car Company as a site for its Pacific Coast factory. The move is regarded as one of the most significant in local automobile circles in recent years as this is the first assembling plant of any auto company on the Coast.

As soon as practical a re-enforced concrete building of three or four stories will be erected for the factory. It is generally understood that the new plant will be used entirely for assembling, but it has been persistently rumored that the company intends to make this San Francisco branch as a distinct unit in the manufacturing of the Ford machine. A representative of the company in this city declares that the plant will be used solely as an auxiliary for the Eastern factory, which is already overtaxed, chiefly for the assembling and distributing of machines.

The site selected is one of the best in San Francisco taking in an entire block in the Mission section at Harrison and Twenty-first streets. The company will have sufficient spur track frontage to enable it to handle a trainload of machines at one time. It is understood that the investment represents a sum in excess of \$125,000.

Convention of Lozier Dealers

DETROIT, MICH., July 15—Branch house managers and dealers of the Lozier Motor Company will assemble here next week for their second annual convention to be held July 17, 18 and 19. Lozier representatives in practically all the important cities and towns have been heard from and an unusually large attendance is expected. Since the 1911 convention the Lozier sales organization has increased rapidly and a big delegation of new dealers from all parts of the country will make their first inspection of the plant.

Plans for the coming year will be discussed at the conference and it is said that several announcements of more than usual interest to Lozier dealers will be made during the week.

Many of the dealers will probably remain over for a week to witness the ceremonies of Cadillaqua, Detroit's big celebration.

Foreign Makers Put Out Cheap Car

WASHINGTON, D. C., July 15—Consul Albert Halstead, Birmingham, England, says: "The success of the low-priced American automobiles in England has received the most careful attention of English manufacturers, with the result that one firm is now ready to put on the market an 800-pound car with wire wheels and gear drive that is expected to do about 40 miles an hour and to go a little over 30 miles per gallon of gasoline; the car complete is to sell for \$650. One of the foremost French manufacturers is also prepared to put a car on the market to sell for the same price."

Slick Swindler at Work in West

ST. LOUIS, MO., July 13—A swindler who styles himself "Jay Deveroe" and combines a fine knowledge of motor cars with the names of prominent men in the trade, has attempted to obtain sundry sums from sales organizations in St. Louis.

Introducing himself as a "road service man" from one of the New England factories, he appeared at a St. Louis automobile

salesroom recently and inquired for the factory sales manager, stating that the latter had left him in Indianapolis and instructed him to meet him in St. Louis.

"Deveroe" assumed that his knowledge of the sales manager's movements would forestall any demand for credentials. He became a zealous mechanic and for 3 days put in his time industriously. He appeared to be worried over the non-appearance of the sales manager, however, and produced what purported to be a telegram from him, stating that he has been delayed and would not reach St. Louis until the following Thursday, but instructing "Deveroe" to remain in St. Louis until he arrived. Claiming he had not received his expense check, he induced the bookkeeper to cash a personal check for \$35. He also desired to send some money home; and in view of the fact that he had "about \$150 coming to him for salary and expenses, which the sales manager would O. K.," he presented a check—drawn upon a trust company in the city where the factory is located—for \$50. Telegraphic communication, however, brought back word that the checks were fraudulent, but before this information reached St. Louis the "road service man" had disappeared.

New Line-Up for Cole Organization

INDIANAPOLIS, IND., July 15—With the absorbing of the Henderson Motor Sales Company by the Cole Motor Car Company, Charles P. Henderson, who was the head of the sales company, becomes the general sales manager of the Cole Motor Car Company. H. C. Lathrop, who was secretary and treasurer of the sales company, takes charge of the local branch of the Cole Motor Car Company with a large allotment of territory. Incidentally he has materially increased his holdings in the Cole Motor Car Company.

The organization which surrounded Mr. Henderson as head of the sales company goes bodily with the Cole Motor Car Company. Some advancements have been made. Ed. Harris, who was in charge of the promotion department, moves to the position of assistant sales manager; while Jay D. Riker, a new man coming from the Parry Buggy factory, takes the promotion department. John A. Murphy, cashier of the sales company, becomes assistant secretary of the Cole Motor Car Company. E. E. Rogers remains in his same post. Homer McKee holds down the job of advertising director; while H. C. Bradfield takes the road as traveling newspaper consultant.

Motorists Object to Gasoline Boost

PHILADELPHIA, July 11—Announcement by the Standard Oil Company of New Jersey today of an increase in the wholesale price of gasoline from 14 1-2 to 15 1-2 cents a gallon was immediately followed by a vigorous protest upon the part of dealers along Automobile Row. Notwithstanding the reasons advanced to support the contention of a necessity for the increase, local automobile dealers are a unit in declaring that the corporation, taking advantage of the large number of machines in use and realizing the indispensability of gasoline in their operation, is making the automobilist the "goat." As the individual owner is the one on whom the burden of the added cost will bear heaviest, dealers are apprehensive lest the discouraging prospect of still further advances which are claimed to be bound to occur will have the effect of decreasing the number of future sales.

Studebaker Bids for Canadian Trade

WALKERVILLE, ONT., July 13—An interesting development of the automobile situation in the Dominion is the formal entrance of the Studebaker Corporation as an active contender for the Canadian trade. The Studebaker interests are now in control of the Walkerville, Ont., plant, formerly known as the E-M-F Company of Canada, and are opening up an aggressive movement directed not only at the trade of the Dominion but also toward caring for the immense foreign automobile business

which has been up to the present handled largely from the Detroit plant of the concern.

The Canadian business has been entirely reorganized and is now known to the world as the Studebaker Corporation of Canada, Ltd. A noteworthy feature in this connection is, however, the fact that in the reorganization the Canadian interests identified with the business from the beginning retain their holdings. A large part of the Dominion-owned stock is in the hands of the Walker family of Walkerville.

Willys to Take Over Garford August 1

TOLEDO, O., July 13—President John N. Willys, of the Willys-Overland Company, since his purchase of the Garford Company at Elyria, O., recently, will have complete charge of the Garford plant, though only in the capacity of general manager, until August 1, after which a reorganization will take place, when Mr. Garford and his officers will retire, giving way to President Willys and a new set of officials. The capital of the Garford company is \$2,000,000, of which \$1,500,000 is common, this latter amount representing Mr. Willys' purchase. The old selling arrangement between the Willys-Garford Sales Company and the Garford company does not terminate until the first of August, hence the reorganization date being set at that time. With the purchase of the Garford and the recent purchase of the Gramm company at Lima, O., the Overland dealers will have a complete line of pleasure cars and trucks to suit all tastes and purses. The Garford plant covers 23 acres and is unusually well equipped, but in the past things have combined to prevent the most being made of it facilities.

Boston to Have Two Shows Again

BOSTON, MASS., July 12—Boston will again have two shows in 1913. The pleasure car section under the auspices of the Boston Automobile Dealers' Association, Inc., will be held as usual in Mechanics' Building, March 8 to 15, inclusive, and the truck show held by the Boston Commercial Motor Vehicle Association, Inc., from March 19 to 26, inclusive.

The first exclusive truck show held last March was a great surprise to all—not only from the volume of business transacted but the general interest and attendance. Practically all the space was subscribed for, and a comparison with the other big shows was all in favor of Boston. From present indications and the applications for space the coming show will eclipse that of last year.

The pleasure car section will as usual prove the great magnet for entire New England—not only will every make of car be shown but elaborate preparations are under way for the usual unique decorative features.

Harking Back a Decade

FROM *The Automobile and Motor Review*, July 12, 1902:

Automobiles for carrying the Russian mails across the Caucasus are to supplant the present system of transporting it by relays of post horses with changes every 10 miles.

A glance at the interior of the tool-box will often give the observant critic a considerable insight into the character of the owner. The too-familiar cupboard, in which spanners, oil-cans, wire, loose nuts, and—too often—inner tubes as well, wallow in a marsh of split oil, grease and resin, sometimes has a variant in a clean and neatly kept receptacle, in which the orthodox set of tools reposes in place.

The Saxon Ministry has given its permission for the introduction of motor cabs in the more populous towns of Saxony, inasmuch as this new mode of locomotion will retain all the features of cab service as compared to other motor vehicles.

It is, of course, easily within the limits of national financiering and engineering to start at New York and build a model road west for 3,000 miles, but there is little likelihood of the road ever being completed in this manner. If the idea is ever real-

Calendar of Coming Events

What the Months Ahead Have in Store for the Automobilst—Shows, Conventions, Race Meets, Etc.

Shows, Conventions, Etc.

July 10-20.....Winnipeg, Man., Canadian Industrial Exhibition.
July 22-27.....Detroit, Mich., Cadillac Week.
Aug. 5-7.....San Francisco, Cal., Pacific Highway Convention.
Sept. 17-20.....Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3.....New York City, Rubber Show, Grand Central Palace.
Dec. 7-22.....Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11, 1913.....New York City, Thirtieth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 4-11.....Cleveland, O., Annual Automobile Show.
Jan. 20-25.....Philadelphia, Pa., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Feb. 1-8.....Chicago, Ill., Annual Automobile Show.
Feb. 10-15.....Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22.....Kansas City, Kan., Annual Automobile Show.
Feb. 24-March 1.....St. Louis, Mo., Annual Automobile Show.
March 3-8.....Pittsburgh, Pa., Annual Automobile Show.
March 8-15.....Boston, Mass., Annual Automobile Show.
March 17-22.....Buffalo, N. Y., Annual Automobile Show.
March 19-23.....Boston, Mass., Annual Truck Show.
March 24-29.....Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

July 21.....St. Louis, Mo., Track Meet.
July 22.....Dallas, Tex., Farm and Ranch Tour, Dallas Automobile Club.
Aug. 8-10.....Galveston, Tex., Beach Meet.
Aug. 30-31.....Elgin, Ill., Road Races, Chicago Automobile Club and Elgin Automobile Road Racing Association.
Sept. 17.....Milwaukee, Wis., Grand Prize Race.
Sept. 20.....Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21.....Milwaukee, Wis., Vanderbilt Cup Race.
Sept.Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.
Sept.Washington, D. C., Reliability Run, Automobile Club of Washington.
Sept.St. Louis, Mo., Track Races, Universal Exposition Company.
Oct. 7-11.....Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 12.....Salem, N. H., Track Meet, Rockingham Park.
Nov. 6.....Shreveport, La., Track Meet, Shreveport Automobile Club.

Foreign

Sept. 26-Oct. 6.....Bourges, France, Agricultural Motor Car Exposition.
Nov. 8-16.....London, England, Olympia Automobile Show.
Jan. 11-22.....Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.

ized, it will be an essential part, if not the culmination, of a general system of road improvement in which all the states will participate.—Editorial.

E. G. Walton, of Minneapolis, Minn., is the first to adopt the motor vehicle for showing real estate to prospective customers.

The F. B. Stearns Company, Cleveland, O., is planning another addition to its factory which is expected to more than double the capacity of the plant. Trouble in securing material has held the company back considerably of late, but it has managed to ship two or three machines each week.

It is now only a matter of weeks before the Winton Motor Carriage Company, Cleveland, O., will move from its birthplace in the old Brush plant to the fine group of buildings which looms up to the view of everyone entering the city from the west along the lake shore.

Nothing has been heard of late of the rotary motor which was in course of construction by Lieutenant Gaysdon, late of the United States Navy. A really practical rotary motor would upset present automobile practice to a terrible degree, but if quite reliable would undoubtedly advance the automobile movement by leaps and bounds in this country, where the uninitiated still talk of the noise, smell and vibration.

The 50-mile endurance run of the Automobile Club of Bridgeport, Conn., was a great success, with the exception that the road and weather conditions were too good, and the operators had such difficulty in holding the speed of their machines down to the legal and club limit of 14 miles an hour in the open sections and 8 miles in the towns, that a number have been disqualified and others are almost sure to be before the official report is published.

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Starter Problem Unsettled

WITH the present pronounced trend to electric lighting, self-starting and more adequate motor lubrication there is a corresponding loss of simplicity in many motors and an added complexity of piping, wiring and lack of accessibility in parts which is regrettable, and which proves conclusively that with many engineers the self-starting arrangement is not a dynamic part of the design but merely an added accessory, an accessory not taken into consideration when the general plan of the motor was made, but one adopted at a time when the engineering corps decided on its adequacy.

The lack of systematic arrangement and almost entire absence of symmetry in motor appurtenance layout speaks plainly of the present unsettled state of the self-starting art and naturally of the lighting art, in that they go together with not a few systems. This does not mean that the maker of the self-starting or lighting equipment has not mastered the art up to its present stage, but rather that the car engineer is lagging a little, has not kept quite up with the pace and therefore is surrounded with an atmosphere of uncertainty and complexity. In many cases he is hesitating between two and sometimes three opinions. In not a few cases he is uncertain as to the merits of the different outfits on the market, not having given them the drastic test; and in not a few cases, particularly in the field of higher car prices, he did not take up the consideration of the various systems as energetically as the times demanded and when it finally came to the de-

ciding moment he was not sufficiently informed on all points to make a definite and clear-cut decision.

One year ago saw the avalanche to self-starters and electric lighting precipitated, just at a time when not a few car makers were ready to make their 1912 announcements. These were delayed a matter of weeks and, in some cases, months until a starter was selected and ways and means devised for installation. It was but natural to expect that the present season would have developed a stage of greater preparedness, but in many cases it has not. The engineering department in more than one factory has experimented with a certain make of lighting or starting apparatus over a period of many months, only to develop minor defects after long use—defects of such moment, however, as not to warrant the installation of such a system without some form of alternative to fall back upon in an emergency. Because of this the present season has already witnessed makers announcing one form of starting equipment, and scarcely a month after such announcement adopting a new policy and deciding to install an entirely different type. With such uncertainty it is impossible to expect other than a muddled-up motor condition, which is seen more this season than for the last 3 or 4 years.

But the difficulty of the present situation is not all confined to the lack of clean-cut appearance, but rather to the uncertainty of the direction of movement in present changes. In the starter field, one maker talks the compressed-air system; at the next factory it has been set aside and only the electric system credited with the mark of approval; at a third factory both of these have been discarded and the acetylene system installed; a fourth sets its mark of approval on the mechanical type at the expense of all others. The net result is that scarcely one of the engineers has given that depth and breadth of research into the situation which it demands. Many of the engineers acknowledge this by the alternatives and substitutes they have installed. There are several motor plants for next season installed with not fewer than three different systems of devices to facilitate starting. Thus you will find a complete self-starter system of air, acetylene, electricity or other form this is augmented by a priming system connected with the gasoline or acetylene line; and added to this is a compression release outfit in connection with the exhaust camshaft. Other designers have installed both the acetylene and electric systems, one to help the other out and either to serve alone if the exigency arises.

Some years ago the duplication of parts was a feature of motor design that came in for general criticism, even the entire double system of ignition and especially the installation of two magnetos drawing the biting remarks of the critics. It was expected that the memory of those days would suffice for all time, but the periodic stampede provoked in the self-starter and electric lighting field has resulted in a return of such conditions. The return is not a credit in every case; the installation of a last-minute selection is apparent the moment the hood is lifted, and it is to be hoped that the experimental departments will work overtime and that soon the self-starting and electric lighting systems will be integral parts of the motor design and not excrescences as many of them appear today. As soon as this comes the public will have renewed confidence, the makers will have cheaper production and the results will be more creditable.

Ocean-to-Ocean Highway Jeffreys Talks on Roads

Los Angeles Transcontinental Road Boosters Arrive in New York—Good Work Accomplished

WILMINGTON, DEL., July 15—On the last leg of the Old Trail Ocean-to-Ocean National Highway project—the object of which is to have a good road constructed across the United States, from the Atlantic Ocean to the Pacific—the campaign committee of the national association which is promoting the project left Wilmington this morning, having spent the night at the Hotel Wilmington, with the expectation of arriving at its destination, the Waldorf-Astoria hotel, New York, this afternoon at 5 o'clock. On leaving Wilmington it was proposed to go to New York by way of Sea Girt, N. J., with the hope of having a conference with Governor Woodrow Wilson, of New Jersey, the Democratic nominee for President of the United States, relative to enlisting his cooperation in the project. The party spent Friday and Saturday in Washington, where they conferred with President Taft and Speaker Champ Clark of the House of Representatives.

The purpose is to secure national legislation whereby the Federal government will bear half the expense of an improved highway across the continent, the states through which it passes to bear the other half of the cost, the expectation being that if Congress agrees to do its part the states will fall in line. In the campaign which ends today, so far as this particular movement is concerned, the party has organized the movement in fifteen states and has secured the signatures of 276,314 persons to a petition advocating the legislation, which will be presented to Congress next December.

Each of the signers is contributing \$1 to the cause, the fund thus raised to be used in defraying the expenses of delegations to take the matter up personally with Congress, which is expected to be necessary to have the matter fully understood. The expenses of the campaign which ends today are being borne by the Los Angeles *Times*. The party which left here today comprised Col. Del M. Potter, of Clifton, Ariz., national organizer of the association; Bert C. Smith, a member of the news staff of the Los Angeles *Times*, and John F. Zak, of Los Angeles. The party left Los Angeles May 15, 1912, and since that time have organized the movement in the following states: California, Arizona, New Mexico, Colorado, Kansas, Missouri, Illinois, Indiana, Ohio, West Virginia, Maryland, Delaware, Pennsylvania, New Jersey and the District of Columbia.

When the pathfinder car arrived at Brighton Beach on Tuesday, July 16, a large crowd gathered to greet it. A vessel containing water which had been taken from the Pacific Ocean was emptied into the Atlantic amid the cheers of the throng.

Jericho Turnpike Open for Travel

After having been closed for nearly two years at points east of Woodbury, the Jericho turnpike, which is the main highway of the north side of Long Island, was opened last Friday. The state, at a cost of more than \$10,000 a mile, has transformed this famous old country road into an ideal motorway.

The new section is 14 miles long, extending from the Nassau County line to the bridge over the Nissequogue River at Smithtown. Eleven miles are of concrete foundation with tar and gravel coating and the last 3 miles are of asphalt-macadam.

The turnpike is reached from New York by way of the Hoffman boulevard and Hillside avenue. It runs from the village of Queens through Floral Park, East Williston, Jericho, Woodbury and Commack to Smithtown. Beyond Smithtown the country roads are in fair condition, enabling the tourist to reach St. James, Stony Brook, Port Jefferson and other towns.

At Banquet Tendered Him in Boston Road Congress Secretary Comments on English and American Practice

BOSTON, July 13—W. Rees Jeffreys, of London, Eng., honorary secretary the Permanent International Association of Road Congresses, is in Boston as the guest of Col. William D. Sohler, chairman of the Massachusetts Highway Commission, and President Lewis R. Speare, of the Massachusetts State A. A.

He is the honorable secretary of the Third International Road Congress to be held in London, July, 1913, when highways and roads will be discussed by the most prominent men from all over the world. Mr. Jeffreys was a guest of honor at a dinner tendered him at the Union Club, Thursday night, by Col. W. D. Sohler, which was attended by Governor Foss.

In discussing his visit to this country Mr. Jeffreys said: "At Washington I appeared before a joint committee of the Senate and House of Representatives and outlined the importance of the road improvement movement throughout the world and I believe that this country will become a member of the congress.

"There is much in the English methods and practices that would prove useful to American engineers, for they would have an opportunity to learn from our mistakes and experiences and not repeat these mistakes over here. One thing in which the English experience would be most helpful is our practice in England of continuous maintenance.

"From the moment it is made a road requires attention. By our system a length of road of certain mileage is put under what is termed a lengthman. His duty is to attend to the small repairs, to patch a hole as soon as it appears, keep the water course clear and trim the sides of the road. As soon as the surface shows signs of wear along comes the steam-roller gang and a new top coat is placed in the highway. As a result of this the main structure is never cut into by heavy traffic. The roads in the United States that I have seen are well made, but they are not maintained properly. The result is that the sub-crust or foundation is gradually being destroyed and the capital expended is largely wasted.

"I believe that the United States through the Federal Government and the State authorities can well afford to concentrate on continuous lengths of road between various centers of population. For instance you have no good road from New York to Philadelphia; no good road from Philadelphia to Washington; from Washington to Pittsburg and from Pittsburg to Chicago. These roads when once constructed should be properly maintained, of course.

"There are three methods by which the highways are kept dustless. One is the application of tar every year, a second to surface them with tar macadam, and a third to put down a surface and grout it in with pitch and asphalt. These various methods would be interesting to American road engineers.

Automobile Bus Railway Feeder

SOUTH BEND, IND., July 13—Direct communication between South Bend and Buchanan was made possible when arrangements were completed with the Southern Michigan Railway to connect with an automobile service at Niles, Mich. Direct connection will be made with every other train in both directions. Through tickets will be sold to all points on the Northern Indiana and Southern Michigan systems. The deal was made with E. B. Clark, president of the Celfor Tool Company, of Buchanan, who contracted for a 15-passenger automobile bus, which is to be delivered within a month, and the service will be established immediately. A fare of 25 cents a trip will be charged between Niles and Buchanan.

News of the Week Condensed



Cole representatives in New York City and automobile writers of metropolitan dailies after a luncheon to President Cole

GATHERING of New York Cole Men—Following the informal luncheon of the New York City representatives of the Cole car and the automobile writers of the various metropolitan newspapers, during President J. J. Cole's Eastern trip, a part of the gathering were photographed, the group being shown in the above illustration.

Ford Sails for Europe—Henry Ford and family left Detroit, Mich., recently for a pleasure trip to Europe.

Club for Moundville—The Moundville, W. Va., Automobile Association has been organized with T. S. Riggs president.

Bus Line Is a Success—The Troy-Canton-Towanda, N. Y., motor bus passenger and freight line opened recently, proving a great success.

Everitt Opens in Columbus—The Everitt Auto Sales Company, recently incorporated in Columbus, O., for \$30,000, has opened a place of business at 307-309 Mt. Vernon avenue, Columbus.

McBride Wins Promotion—D. K. McBride has been promoted from office manager of the Universal Motor Truck Company, Detroit, Mich., to the position of factory manager of the company.

Langhorn Leaves Packard—J. T. Langhorn has resigned as manager of the truck department of the Packard Motor Car Company, Detroit, Mich. Up to the present time he has made no plans for the future.

Bus Line Opened—An automobile passenger service has been opened between Gang Mills and Painted Post, N. Y., a Reo five-passenger machine being used. Later the service will be extended to Lake Lehigh.

Winter Now with Universal—H. L. Winter, formerly sales manager of the Federal Motor Truck Company, has taken the position of general sales manager with the Universal Motor Truck Company, Detroit, Mich.

Wilson Goes to Des Moines—Orrin S. Wilson, formerly manager of the Studebaker's Rocky Mountain branch at Denver, Col., has taken charge of the Iowa factory branch of the Studebaker Corporation in Des Moines.

Warehouse in San Antonio—Carl Harris, South Texas representative of the Studebaker corporation, is establishing a large warehouse in San Antonio, Tex., for the purpose of making that city the distributing center for South Texas.

Michigan's Show Promising—All the available space for the Michigan state fair automobile show has been taken, forty-one automobile firms having engaged booths. Electric, gasoline and commercial vehicle manufacturers are represented.

After the Cutout—An ordinance is pending in the City Council of Columbus, O., to stop all of the muffler noises on automobiles, and motorcycles and it is believed the measure will become a law. The ordinance provides for fines from \$10 to \$50 for its violation.

Has Two Service Stations—The Imperial Motor Car Company, Cincinnati, O., representatives for Cole and Stearns cars, have moved into a new service building and salesroom at 1609 Madison road. They will also retain their old location at Peebles corners.

Lane a Railroad Director—M. H. Lane has been elected to membership in the directorate of the Grand Trunk Railroad to succeed E. H. Fitzhugh, who resigned to take the presidency of the Central Vermont Railroad. Mr. Lane is president of the Michigan Buggy Company, Kalamazoo, Mich., builder of the Michigan car.

Specializing on Supplies—The Jones Auto Company, Oakland, Cal., has given up the selling of automobiles, as its accessory business has increased to such an extent that it requires the company's entire attention. The two large stores of the company have been converted into one in order to centralize the business.

Stutz Agent Moves—The Stutz Motor Car Company, Boston, Mass., has moved into its new salesrooms, 895 Boylston street.

Discontinue Their Agency—J. C. and E. A. Kimmel, Columbus, O., who have been central Ohio distributors for the Speedwell, have discontinued business.

Bids Wanted in Columbus—The Columbus, O., Board of Health will receive bids July 25 for two 2-passenger, 4-cylinder, 20-horsepower automobiles for use in the health department.

Big Parade at Hornell—More than one hundred gorgeously decorated automobiles were in line in the parade held recently in Hornell, N. Y., in connection with the Old Home Week celebration.

Smith Is Sales Manager—Arthur T. Smith, formerly of the Packard Motor Car Company, has been appointed sales manager of the A. Elliott Ranney Company, New York City, distributors of the Hudson.

Evans in Charge of Trucks—H. W. Evans, who has been connected with the San Francisco branch of the Locomobile Company for the last 2 years, has been put in charge of the truck business of the company on the Pacific Coast.

Forestville Climb Postponed—Inability of the committee in charge of the third annual hill climb to secure sufficient entries for the various events was the cause for postponing the Forestville, N. Y., annual hill climb until next July.

Three Cars for Buffalo—The councilmanic board of Buffalo, N. Y., has granted permission to the public works department to purchase three automobiles, each to be uniform in color and the name of the department to be imprinted on each machine.

Formed to Handle Lincoln—The Baldwin Smith Motor Truck Company, Wichita, Kan., has been organized for the purpose of handling commercial motor trucks in Wichita and vicinity. They have become distributing agents for the Lincoln light delivery wagons.

For Automobile Regulation—The advisory commission to

Mayor Shank has recommended that there be introduced in the Indianapolis, Ind., city council an ordinance forbidding motor cars to pass a street car while the latter is receiving or discharging passengers.

Line Between Elmira and Troy—A motor truck service for the shipment of freight and express consignments is soon to be conducted between Elmira and Troy, N. Y. The trucks will make daily trips between these points, receiving consignments along the route.

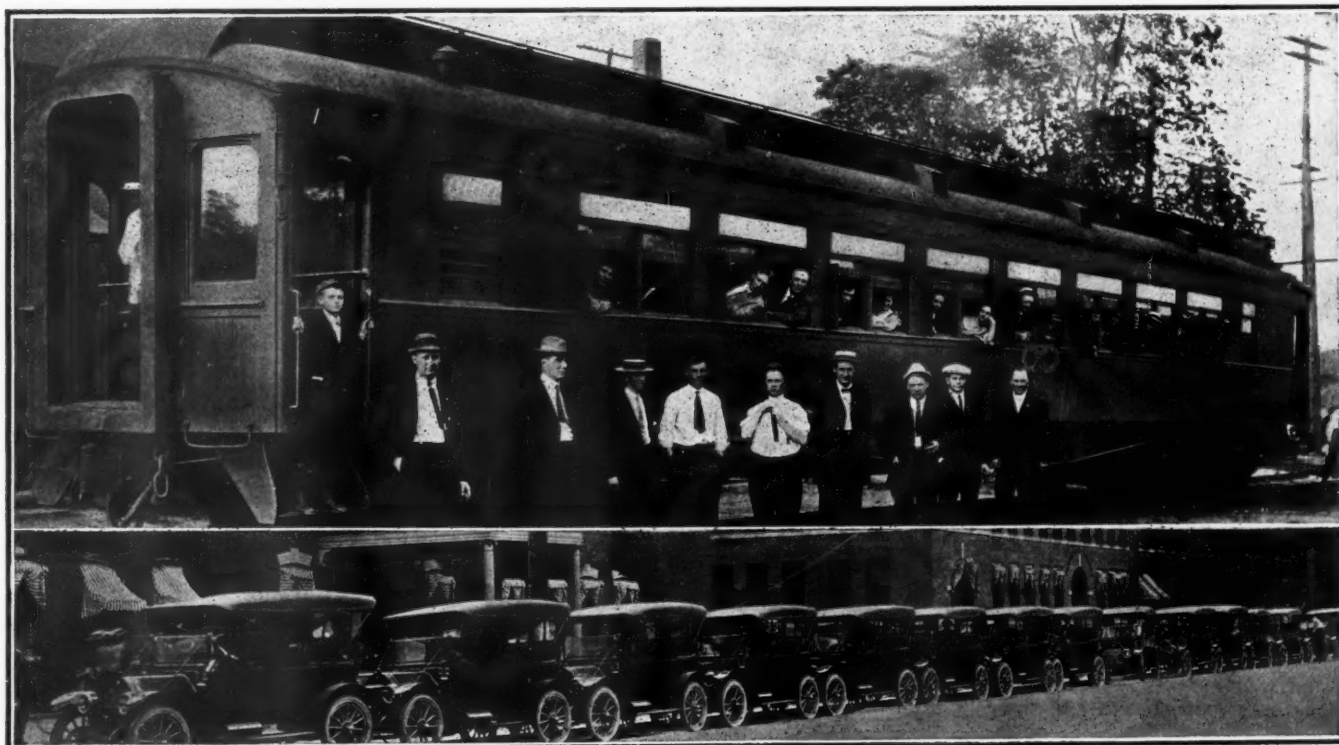
Radford Now Factory Manager—W. H. Radford has been promoted to the position of factory manager of the Warren Motor Car Company, Detroit, Mich. His former position as designing engineer and chief of the engineering department has been taken by W. H. Knowles.

Enlarge in Winnipeg—In order to meet the demands of business Joseph Maw & Company, Winnipeg, Man., are extending their premises. The firm has leased the ground floor of the adjoining Monarch Life Assurance Company building, which they intend using for exhibition purposes.

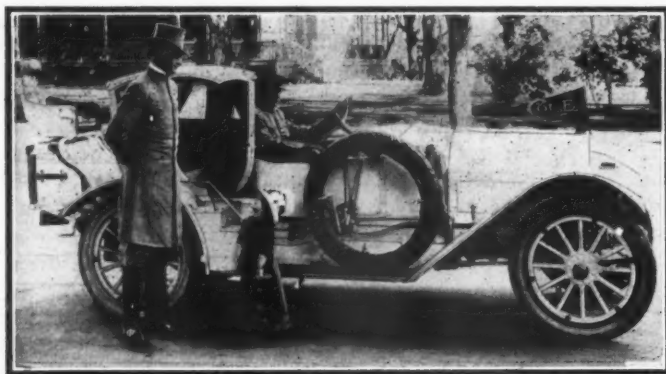
Orphans Entertained at Hamilton—Orphans' Day, which was held in Hamilton, Ont., recently, proved a great success. About thirty-five automobile owners donated their machines for the use of the orphans, who were driven to Grimsby Beach, where races featured the afternoon's entertainment.

Ground Broken for Building—Work has already started on the new building for the United States Tire Company at the junction of Beacon street and Commonwealth avenue, Boston, Mass., and the foundation will be finished shortly. It is expected that the new structure will be ready for occupancy by January 1.

Reo Tourists Arrested—Thirty enthusiastic automobilists from Fort Dodge, Ia., including five ladies, recently left the Reo factory at Lansing, Mich., in their newly-purchased Reo cars for Fort Dodge—a 600-mile trip. They displayed Iowa license tags on their cars and the Lansing police, misunderstanding the provisions of the state law regarding non-residents, arrested the entire party. The matter was straightened out and the tour was continued.



Upper picture shows the specially chartered Pullman in which thirty enthusiastic automobilists traveled from Fort Dodge, Ia., to the Reo factory at Lansing, Mich. Lower picture shows the fifteen new Reos in which the party returned to Fort Dodge



Special Cole of the Princess Victoria, showing coupé body small enough for the little lady

Culp Financial Manager—George P. Culp has been appointed financial manager of the automobile business of A. M. Zimbrich, Rochester, N. Y.

May Use Automobiles—The International Railway Company of Buffalo, N. Y., is considering the advisability of installing automobile wagons in the emergency department.

Reed Wins Promotion—F. L. Reed has been promoted to the general managership of the Schacht Motor Car Company of Canada, with general office and factory in Hamilton, Ont.

Branch in Nashville—The Oakland Motor Company is installing a factory branch at Nashville, Tenn., in charge of M. D. Stone. A repair shop of considerable size will be equipped.

Stewart Is Manager—J. O. Stewart is the newly appointed manager of the Spokane, Wash., branch of the Diamond Rubber Company. Mr. Stewart succeeds W. J. Voit, who removed to Los Angeles.

Back to San Francisco—In the recent readjustment of the Pioneer Automobile Company, of San Francisco, Cal., A. C. Wheelock, the former Fresno manager, returns to San Francisco as assistant manager of the main office.

Monson General Manager—M. J. Monson has been appointed general manager of the Wisconsin and upper peninsular branch of the Buick Motor Company, with headquarters at the district branch house in Milwaukee.

Essenkay in Boston—The Essenkay Company, Chicago, Ill., has leased the quarters in the Motor Mart, Boston, Mass., formerly used by the Alvan T. Fuller Company, agent for the Packard, and will be ready to do business soon.

Sell Out Interests—Christopher F. Whitney and Charles H. Barney have sold out their interest in the Whitney-Barney Company, Boston, Mass., to Frank B. Wilcox. The latter and Fred P. Lucas will probably carry on the business.

Philadelphia Sells Horses—Director Cooke, of the Philadelphia department of public works, has ordered the sale on Friday, July 19, of the horses and carriages heretofore used by the local Highway Bureau inspectors. Automobiles will be used in their stead.

New Ordinance in Dayton—A new police traffic ordinance has gone into effect at Dayton, O., the chief provisions of which relate to the keeping on the right side of the street, backing up automobiles or other agents of transportation to the curb and paying strict attention to the orders of the police on the subject of traffic.

Quits Brokerage for Motor Business—M. E. A. Stoddard, one of the largest stockholders of the Stoddard Motor Car Company, Springfield, Mass., has resigned as manager of the Springfield branch of T. G. Coombe & Company, members of the New York stock exchange, to give his entire time to the management of the motor agency.

Distributes Copies of State Law—In order to bring about

a better understanding of the laws of the road and to minimize the danger from accidents the Automobile Club of Vermont has had printed a large number of small fliers in which that section of the state law governing the mode of travel on the highways is covered. These are being distributed to motorists and owners of horse-drawn vehicles.

Big Rambler Convention—The annual convention and school of instruction for Rambler representatives was held at the factory of the Thomas B. Jeffery Company, Kenosha, Wis., July 9, 10 and 11. More than 100 branch managers, sales managers and agents were present to inspect the next issue of Rambler cars and attend the experience meetings.

Sheboygan Elects Officers—The Sheboygan Machine Company, Sheboygan, Wis., organized several months ago by former associates in the Falls Machine Company, of Sheboygan Falls, Wis., has elected the following officers: President, Frederick Karste, Jr.; vice-president, Albert Teffen, Jr.; secretary, Charles Kummings; treasurer, Lester Nelson. The company is capitalized at \$10,000 and is engaged in the manufacture of gasoline motors and other machinery.

State Officials at Bretton Woods—Motorists from other states who go touring through the White Mountains of New Hampshire this summer, and who wish to stay more than the allotted 10 days in the state, can get a 3-month registration now at reduced rates. Those who tour through from the North and visit Bretton Woods will not need to go to Concord to the office of the secretary of state, for that official has appointed a deputy with headquarters at the Mt. Washington Hotel to issue registrations.

Princess Victoria Coupé—The Princess Victoria, called the Miniature Melba of the footlights, is a stage curiosity. In order to make her appeal more strongly to the public her manager uses a white-enameled Cole and a giant liveried footman as features in traveling about the country. The car is a regular stock machine except that a coupé body is mounted in the rear of the roadster seats, the gasoline tank having been placed under the body.

Automobile Incorporations

AUTOMOBILES AND PARTS

BROOKLYN, N. Y.—Dunham Auto Company; capital, \$15,000; to deal in automobiles. Incorporators: D. Dunham, L. Carmadella, C. L. Apfel.

CAMDEN, N. J.—Auto Distributors Limited Company; capital, \$200,000; to manufacture, buy and sell automobiles and other vehicles. Incorporators: Frank R. Hansell, J. C. Clow, John A. McPeak.

CHICAGO, ILL.—Dearborn Automobile Company; capital, \$10,000; to manufacture automobiles and accessories. Incorporators: Sidney Oppenheim, Author Rosenthal, John C. Ahrensfield.

CLEVELAND, O.—Clutch Company of Cleveland, capital, \$200,000; to manufacture and sell friction clutches and lubricating devices. Incorporators: J. W. Thorman, O. W. Carpenter, H. F. Meyer, C. C. Clelland, B. W. Ten Eyck.

COLUMBUS, O.—Ideal Motor Car Company; capital, \$200,000; to manufacture automobiles.

GOSHEN, N. Y.—Coates Commercial Car Company; capital, \$250,000; to manufacture freight automobiles. Incorporators: Robert Gibson, Jr.; L. Barton Case, Powell Crichton.

GRAND RAPIDS, MICH.—Austin Automobile Company; capital, \$500,000; to manufacture automobiles. Incorporators: James E. Austin, Walter S. Austin, George H. Davidson.

MUNCIE, IND.—Miko Machinery & Supply Company; capital, \$1,000; to deal in machinery and material for the manufacture of automobiles. Incorporators: Carl D. Fisher, J. M. Heron, O. B. Bannister.

NEWARK, N. J.—W. S. Motor Company; capital, \$300,000; to manufacture automobiles. Incorporators: J. M. Woods, C. H. Tebbets, L. F. Fetser.

NEW YORK CITY.—Munsing Tractor Company; capital, \$600,000; to manufacture and deal in automobiles. Incorporators: Basil Mager, Robert H. Allen, Herman C. Kluse.

NEW YORK CITY.—Stationery & Marine Motor & Supply Company; capital, \$50,000; to manufacture motors and supplies. Incorporators: Thomas Lillis, Ralph A. Corely, Frederick W. Knipscher.

PORTLAND, ME.—Universal Motor Truck Company; capital, \$10,000; to manufacture and deal in automobiles. Incorporators: Clarence E. Eaton, T. L. Croteau, James E. Manter.

ROCHESTER, N. Y.—Shafer-Decker Company; capital, \$50,000; to manufacture and deal in automobiles. Incorporators: C. P. Hugo Schoellkopf, Charles B. Shafer, Frederick J. Decker.

SYRACUSE, N. Y.—New York Motor Company, Incorporated; capital, \$10,000; to manufacture motors. Incorporators: Ernest W. Lawton, Theodore Young, Charles S. Lawton.

Syracuse Orphans Ride—The Automobile Club of Syracuse gave the inmates of the Onondaga Orphans' Home their annual ride recently, fifty automobiles being filled to capacity.

Fosdick Resigns from Stevens-Duryea—Harry Fosdick, sales manager of the Stevens-Duryea Company, Chicopee Falls, Mass., has resigned from his position with the company.

New Seattle Hudson Agent—James C. Murray, formerly representative of the Hudson company in Seattle, Wash., will be succeeded by G. L. Rodd, who will head the Pacific Motor Car Company.

Peoria Cadillac Crew Parades—The first annual gathering and parade of Peoria, Ill., Cadillac owners was held in that city a few days ago. There were 160 cars in line, which paraded through the city.

Fire Protection Installed—A complete fire protection system has been installed in the Mitchell Garage, Racine, Wis., at a cost of \$5,000. The garage is now regarded as a model from the safety standpoint.

Moves to Detroit—J. A. Thorsen, advertising manager of the Lion Motor Car Company, Adrian, Mich., has transferred the advertising headquarters of the company to Detroit, where he will be located hereafter.

Tuttle Quits Dayton Management—Harry Tuttle has announced that on August 1 he will sever his connection with the Dayton Motor Car Company, Dayton, O., for which he has acted as service manager for some time.

Automobile Street Car Service—The thriving town of Dayton, Ore., located 33 miles southwest of Portland, has recently established the first automobile street car service in the state of Oregon. M. G. Miller is the owner.

Promotion for Windholz—R. L. Windholz has been made the head of the recently established Detroit office of the Sloan & Chace Manufacturing Company, Newark, N. J., manufacturers of precision machinery and special tools for the automobile trade.

Visits Detroit Company—A. Boulade, general manager of

the French Societe du Carburateur Zenith, recently visited the factory of the Zenith Carburateur Company, Detroit, Mich. The capital of this company has lately been increased from \$10,000 to \$50,000.

'Bus Company Reduces Fares—What is believed to be the lowest tariff of fares charged in the country by a motor 'bus company has just been placed in effect by the Rapid Motor-transit Company, Indianapolis Ind., which is now selling six tickets for 25 cents and twenty-five tickets for \$1. This reduction has been made to meet the fares charged by the street railway company.

Kansas City Agencies Discontinued—There will be many changes in the managements of agencies and branches of Kansas City, Mo., in the near future. The Albertson-Boyd Motor Car Company, former agents for Marmon and Hudson products, have discontinued these lines and both manufacturers will institute factory branches. The Everitt and Franklin factories have also installed factory branches.

Columbus Seal Red and Blue—The Columbus Automobile Club, Columbus, O., has adopted a red and blue flag bearing the seal of the state of Ohio as a pennant, to be carried on all cars of the members. The purpose is to advertise the coming state centennial celebration. On the night of August 26, the members of the club will join in a big automobile parade which will be preliminary to the centennial celebration.

New Goodyear Building—The Goodyear Tire & Rubber Company of New York has moved into its new building at Broadway and Sixty-seventh street, New York City. The structure is an L, five stories and basement, with 20,000 square feet of floor space. The company has also purchased 2 acres of land in Long Island City and will erect thereon a six-story warehouse of 96,800 square feet of floor space. This warehouse will be ready for occupancy by January 1, 1913.

Wesco Now Wholesale—The Wesco Supply Company, St. Louis, Mo., manufacturers and jobbers of electrical supplies, have recently taken up the handling of automobile accessories at wholesale. They have warehouses in Fort Worth, Tex., and Birmingham, Ala., in addition to their large building at Seventh street and Clark avenue, St. Louis, Mo., and have twenty-five salesmen on the road. The automobile accessories department has been placed in charge of A. E. Rosenberg.

Automobile Incorporations

GRAND RAPIDS, MICH.—Simpson Automobile Supply Company; capital \$35,000; to buy and sell automobiles, supplies and accessories. Incorporators: E. W. Simpson, E. R. Corbin, F. J. Goders.

GARAGES AND ACCESSORIES

CINCINNATI, O.—Acme Motor Delivery Company; capital, \$15,000; to haul and deliver goods by automobiles. Incorporators: William Ernst Minor, Fred L. Allen, Stuart B. Sutphin, David Washman, James Bradford Minor.

CLEVELAND, O.—Saunders Auto Supply Company; capital, \$20,000; to manufacture and sell automobile lever locks and other accessories. Incorporators: C. J. Robinson, S. W. Sparks, J. A. Blakely, B. V. Selby, Ishen F. Allen.

GRAND RAPIDS, MICH.—Grand Rapids Motor Realty Company; capital, \$50,000; to conduct the affairs of the Grand Rapids Automobile Club. Incorporators: Charles A. Phelps, Alvah W. Brown, M. T. Van Den Bosch, Elmer Kinsey, G. A. Hendricks, O. H. L. Wernicke, R. E. Tietser, Harold V. M. Tuthill, C. H. Walker.

NEW YORK CITY.—Circle Taxicab Company; capital, \$2,800; to engage in the taxicab business. Incorporators: John Hefferon, Margaret T. Hefferon, John F. Kavanagh, Catherine J. Kavanagh.

NEW YORK CITY.—Resident Punctureless Tire Company; capital, \$200,000; to manufacture a punctureless tire. Incorporators: Flossie M. McGrady, Seth H. Sheldon, LeRoy McGrady.

NEW YORK CITY.—Tanner Rubber Company; capital, \$10,000; to manufacture rubber goods and tires. Incorporators: Harry Tannerbaum, Jacob Tannerbaum, Philip F. Tannerbaum.

NEW YORK CITY.—William C. Reynolds, Inc.; capital, \$3,000; to deal in automobile supplies. Incorporators: Charles W. Reynolds, Rene Dequet, Otto Schiller.

SYRACUSE, N. Y.—Jefferson Garage Company; capital, \$30,000; to conduct a garage and repair business. Incorporators: A. Metzen, C. J. Rochm, C. J. Blaumer.

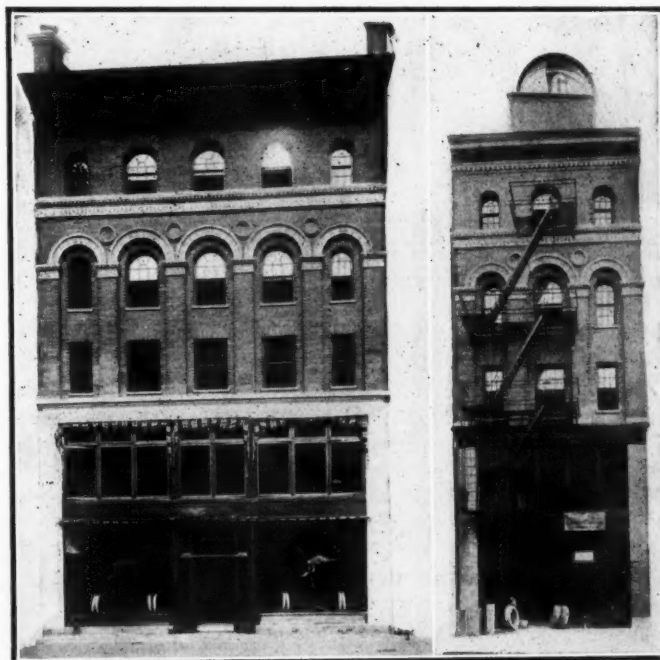
CHANGES OF CAPITAL

AKRON, O.—Akron Rubber Mold & Machine Company; capital increased from \$10,000 to \$30,000.

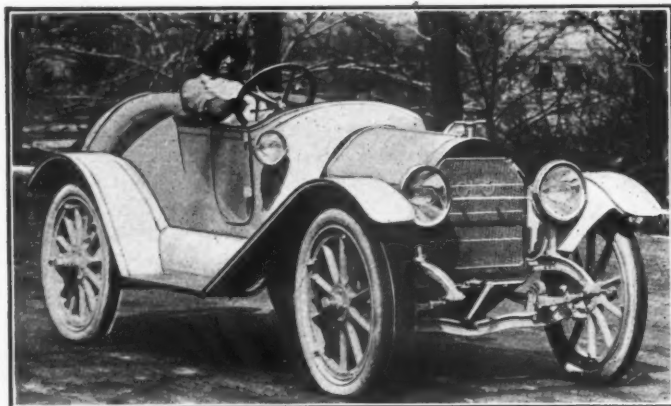
AUGUSTA, ME.—Universal Motor Truck Company; capital increased from \$10,000 to \$500,000.

BRIDGEPORT, CONN.—Locomobile Company of America; capital increased from \$5,000,000 to \$6,500,000.

DETROIT, MICH.—Zenith Carburateur Company; capital increased from \$10,000 to \$30,000.



Broadway and Sixty-seventh street views of the new Goodyear building in New York City



Mrs. E. A. Blaney, of Cincinnati, O., in her Ohio car

Cincinnati Has Woman Tourist—Mrs. E. A. Blaney, Cincinnati, O., has acquired a considerable reputation as a cross-country driver. The accompanying illustration shows Mrs. Blaney in her Ohio roadster.

New Frisco Oldsmobile Manager—George S. Morrow, formerly factory representative of the Oldsmobile Company, has been made retail sales manager of the San Francisco, Cal., branch.

Ford Western Agent Moves—The Alkire-Smith Auto Company, Utah, Western Wyoming and Southern Idaho agents for the Ford car, has moved to its new quarters at 67 West Fourth street, Salt Lake City.

Marmon Considers Another Branch—The Nordyke & Marmon Company, Indianapolis, Ind., is considering the establishment of a branch in Kansas City, Mo. Fred Clinton is looking for a suitable site for the factory.

Diamond Los Angeles Change—F. O. Nelson, manager of the Los Angeles branch of the Diamond Tire Company, will be succeeded in that position August 1 by W. J. Voit, now branch manager at Spokane, Wash.

St. Louis Buys Cars—The city of St. Louis, Mo., has bought fifteen Ford roadsters for use of the inspectors in the street and other departments. Touring cars for the heads of the several departments are also to be purchased, bids having been called for furnishing them. The city will also buy two 5-ton trucks, a 2-ton truck and a 1,500-pound motor wagon.

Motors Usurping Hand Cars' Place—The Toledo & Ohio Central has adopted gasoline motor cars for track work and inspection. Five modern type gasoline cars have been placed at the disposal of section men operating from Bellefontaine, O., and intervening points. Old-time hand-cars are disappearing from all the railroads.

Gets New Landlord—The property at 754 Main street, Buffalo, N. Y., which is occupied by the Pierce-Arrow Company's sales department and garage was sold this week by William H. Hotchkiss to Walter L. Schoellkopf for \$250,000. The purchase was made solely as an investment and the Pierce-Arrow Company will remain in the building.

Klose Made Branch Manager—O. W. Klose has been made manager of the United Motor Minneapolis Company, Minneapolis, Minn., to succeed E. B. Stimson. Appointment was made by S. D. Porter of Kansas City, western supervisor. Mr. Klose has sold Maxwell cars for 8 years. He is the youngest branch manager with the company.

Foss-Hughes Buys in Providence—The Foss-Hughes Automobile Company, which has the agency for the Pierce-Arrow car for Providence, R. I., Philadelphia and other cities, has purchased 35,000 square feet of land at the corner of Wesleyan avenue and Plenty street, Providence, R. I., for the purpose of erecting a modern brick salesroom and service depot. Work on the new building will be started at once.

New Automobile Agencies

PLEASURE CARS		
Place	Car	Agent
Amsterdam, N. Y.	Cole	William M. McCaffrey.
Aurora, Ill.	R-C-H	C. C. Hinckley.
Baltimore, Md.	Detroit	L. S. Nock.
Baltimore, Md.	R-C-H	Shaffer Mfg. Co.
Bay City, Mich.	R-C-H	Miller Auto Co.
Bethany, Mo.	R-C-H	Bert L. Layson.
Breymer, Mo.	R-C-H	A. Wells & Co.
Bristol, Vt.	Ford	W. A. Lawrence.
Camden, N. J.	R-C-H	Yale Motor Co.
Canby, Minn.	Cole	C. M. Anderson.
Castle, N. Y.	R-C-H	Cook Bros.
Chicago, Ill.	R-C-H	Victor F. Michelson.
Cincinnati, O.	R-C-H	Olds-Oakland Motor Co.
Conneautville, O.	R-C-H	Penn Auto Co.
Cornell, Ill.	R-C-H	J. H. Reichardt & Co.
Dansville, N. Y.	R-C-H	Willard Morris.
Des Moines, Ia.	Empire	Cartercar Iowa Company.
Des Moines, Ia.	Chalmers	Iowa Auto & Supply Co.
Des Moines, Ia.	R-C-H	Sears Automobile Co.
Drayton, N. D.	R-C-H	Drayton Auto Co.
Duluth, Minn.	R-C-H	Woods Bros.
Dunkirk, N. Y.	R-C-H	Henry Schaefer.
Elmira, N. Y.	R-C-H	F. E. Wickwire.
Fargo, N. D.	Cole	John Wyman.
Frederick, Okla.	R-C-H	Morris & McHugh.
Freeport, Ill.	R-C-H	H. Ohlendorf.
Galveston, Tex.	Correja	R. S. Carter.
Goldsboro, N. C.	R-C-H	W. A. Blackburn & Co.
Guilford, Conn.	Ford	S. B. Hull.
Hamburg, Ia.	Cole	George Grape.
Hartford, Conn.	R-C-H	Walter J. Connelly.
Hazleton, Pa.	R-C-H	Smith Motor Car Co.
Hiram, O.	R-C-H	Vincent & Hurd.
Hornell, N. Y.	R-C-H	Peters & Kittell.
Houston, Tex.	R-C-H	Worthrup & Clark.
Jackson, Mich.	R-C-H	J. E. Weber.
Jamestown, N. Y.	R-C-H	Slawson & Lounsbury.
Kansas City, Mo.	R-C-H	E. E. Guthrie & Henry Winn.
Lexington, Ky.	Cole	R. E. Graybill.
Lynchburg, Va.	R-C-H	Model Garage.
Marine City, Mich.	R-C-H	W. H. Mannell.
Maple Park, Ill.	R-C-H	A. A. Marvin Sons & Co.
Malta Bend, Mo.	R-C-H	Cole Bros.
Manila, P. I.	Cole	R. N. Clark.
Medina, N. Y.	Cole	Charles Dye.
Mendota, Ill.	Franklin	Their & Gehant.
Minneapolis, Minn.	Havers	A. F. Chase & Co.
Moose Jaw, Sask.	Cole	Percy D. Shand.

News of the Garages

Largest in State—The garage being built for W. A. Kirk at New Haven will be the largest one in the state, according to the builders, the structure being four stories high with 40,000 square feet, with a capacity for 250 cars. A 10-ton elevator will be installed to carry the cars up and down.

New Garage at Groveland—H. L. MacDonald, who has the agency for the Kissell Kars at Groveland, Mass., has just completed a large brick garage.

Sells McClure Garage—J. M. Connolly has sold the McClure Garage, located at McClure, O., to John Harmon for \$2,500.

Service Station for Everitt—A new garage and service station four stories high and about 90 by 50 ft. is being erected in Boston, Mass., for the local agency for the Everitt car.

To Build in Louisville—The Clark Motor Company, Louisville, Ky., has acquired a 10-year lease on a site on Broadway, where the company proposes to erect a \$15,000 building.

To Build in Albany—John Croissant has completed plans for the construction of a large automobile garage at 205 Washington avenue, Albany, N. Y. The building will be three stories in height.

New Ford Service Station—The Ford Motor Company expects to occupy its new service garage in Winnipeg, Man., during the latter part of July and will set apart space for the accommodation of the Minneapolis and St. Paul tourists during their tour to Winnipeg.

Almost Ready in Winnipeg—The Tudhope Anderson Company will soon take over its new garage in Winnipeg, Man., and will have a complete service plant for the benefit of Tudhope car owners. This is the same car as the American Everitt, but sold under the Tudhope name in Canada.

New Automobile Agencies

PLEASURE CARS		
Place	Car	Agent
Moro, Ore.....	Cole	W. H. Moore.
Morris, Minn.....	R-C-H	Olson-Hemming Auto Co.
Mount Pleasant, Mich.....	R-C-H	B. E. Graham & Co.
New Philadelphia, O.....	R-C-H	O. W. Smith.
Newport, Pa.....	R-C-H	W. L. Reisinger.
Nehawka, Neb.....	Cole	V. P. Sheldon.
New York City.....	R-C-H	Central Motor Car Co.
Niles Center, Ill.....	R-C-H	Niles Center Garage Co.
Norwich, Conn.....	Franklin	F. O. Cunningham.
Omaha, Neb.....	Apperson	Apperson Jack Rabbit Co.
Omaha, Neb.....	Cole	Cole Motor Car Company.
Omaha, Neb.....	Packard	Orr Motor Sales Co.
Omaha, Neb.....	R-C-H	Lining Implement Co.
Palatine, Ill.....	R-C-H	Heckbarth & Shering.
Pasadena, Cal.....	R-C-H	Muncie Motor Co.
Raleigh, N. C.....	R-C-H	Capitol Motor Car Co.
Rensselaer, Ind.....	R-C-H	John M. Knapp.
Revere, Mass.....	Ford	Walter T. White.
Richmond, N. Y.....	R-C-H	I. A. Silvie, Jr.
Southampton, N. Y.....	R-C-H	William H. Hedges.
Springfield, Mass.....	Henderson	Forest City Garage.
Sterling, Ill.....	R-C-H	E. L. Warneke.
St. Paul, Minn.....	R-C-H	White Bear Auto Co.
Traverse, Minn.....	R-C-H	John A. Johnson.
Troy, N. Y.....	R-C-H	James N. Bussey.
Viola, Ill.....	R-C-H	Worley & Terry.
Walla Walla, Wash.....	Cole	Moore Automobile Co.
Wareham, Mass.....	Ford	B. Burleigh Sisson.
Washington, D. C.....	R-C-H	Dailey Motor Co.
Westpoint, Neb.....	Cole	W. H. Kehoran.
Whitakers, N. C.....	R-C-H	W. T. Hearne.
Wilmington, N. C.....	R-C-H	Wilmington Auto Repair Co.
York, Pa.....	Cutting	York Rubber Tire Co.
York, Pa.....	Hudson	Auto & Truck Sales Co.
York, Pa.....	R-C-H	York Garage & Supply Co.

ELECTRIC CARS

Boston, Mass.....GrinnellA. P. Underhill.

COMMERCIAL VEHICLES

Columbus, O.....AlcoM. P. Murnan.
 Portland, Me.....UniversalUniversal Motor Truck Co.
 Providence, R. I.....VeeracMotor Service Co.
 Wichita, Kan.....LincolnBaldwin-Smith Motor Truck Co.

Addition to Paulding—The Paulding Auto Company, Paulding, O., is building an addition to its present establishment.

To Open in Riverton—C. A. Thuman is building a garage in Riverton, Ia., where he will engage in the automobile business.

New Garage in Omaha—Andrew Murphy & Son, Omaha, Neb., have started work on a new garage next to their present building.

Change in Punxsutawney—P. O. Freas has disposed of his garage in Punxsutawney, Pa., to T. M. Kurtz, who will continue the business.

To Conduct Garage—The West Allis Machinery & Auto Company has been formed in West Allis, Wis., to conduct a garage and machine shop.

Packard Building Garage—A one-story garage, 137 by 69 ft., is being constructed in Philadelphia for the Packard Motor Car Company. The building will cost \$12,000.

Eureka Company Builds Addition—The Eureka Motor Car Company is preparing for the construction of an addition to their garage on Adams avenue, Scranton, Pa.

Bosworth Makes Extensive Addition—An extensive addition is being made to the automobile plant and garage of E. G. Bosworth & Company in Birmingham, Ala.

Building in Baltimore—The Colonial Motor Company, Baltimore, Md., is having a new garage built. It will be two stories high, of ornamental concrete and brick.

Another \$12,000 Garage—Edward Cunningham is building a one-story garage at Twenty-second and Race streets, Philadelphia, Pa., for the Pennsylvania Galvanizing Company, to cost \$12,000.

Garage for Plymouth—Torke Brothers are erecting a three-story building of fireproof construction, 50 by 120 feet,

in Plymouth, Wis., to be used for garage and machine shop purposes. It will cost \$30,000.

Completed in Shreveport—A new fireproof garage has been completed for the Orme Motor Car Company, Shreveport, La. The new building cost \$8,000. The Orme company handles the Moon.

\$12,000 Garage for New York—Otto Freyer will build a one-story brick garage, on the south side of 155th street, New York City. Plans filed by Architects Horunburger & Bardes place the cost at \$12,000.

To Open in Buffalo—An automobile association known as the "Auveco," recently formed in Buffalo, N. Y., is completing arrangements for the opening of a commercial and pleasure vehicle garage and salesroom.

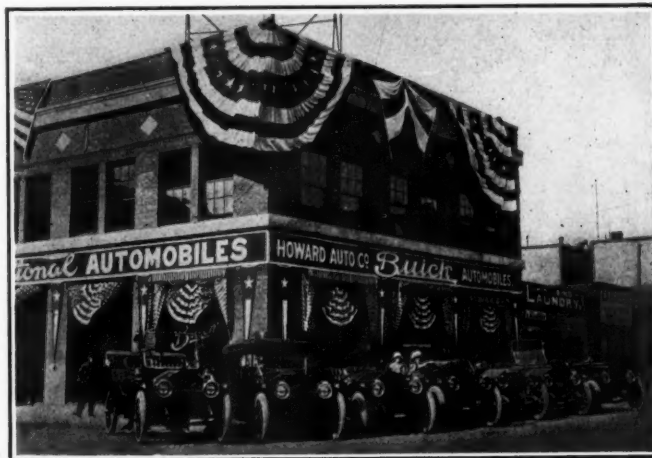
Adopt Garage Amendment—Following a hearing in the board room of the District Building recently the Commissioners adopted an amendment to the building regulations, providing for the colonization of public garages in Washington, D. C.

Franklin in Milwaukee Enlarging—The Franklin Automobile & Supply Company, Milwaukee, Wis., local dealers in Franklin automobiles, are enlarging their quarters to include a frontage from 321 to 327 Fourth street. Every modern facility is being provided to make this garage and salesroom one of the best equipped in the Middle West.

Celebrates National Victory—After Joe Dawson's National won the 500-mile race at the Indianapolis Speedway various agencies for that car celebrated the victory by decorating their showrooms. Among these was the Howard Auto Company, Portland, Ore., whose salesroom is shown in the accompanying illustration.

Largest Company in Northwest—By taking over the Conge Motor Company garage, St. Paul, Minn., the White Bear Automobile Company, A. J. Diamon, president, lays claim to being the largest automobile company in the Northwest. The company plans service garages in all parts of the city. It occupies one building in St. Paul, another at White Bear Lake and a third building is being erected, and a contract will be let soon for an electric station.

Bangor Garage Burned—The garage of the S. L. Crosby Company of Bangor, Me., was destroyed by fire recently and about 40 cars were either destroyed or badly damaged. The fire was caused by the ignition of a gasoline tank on a brazier and spread so quickly it was impossible to check it or remove the cars. Roger H. Swan, one of the employees, was badly burned about the face and body and two others were slightly burned before they managed to get out. The loss on the building was \$15,000, but the loss on the cars could not be estimated.



National agent in Portland, Ore., celebrating victory

Motor Fire Apparatus

To Buy a Fire Truck—The Grand Island, Neb., city council is considering the purchase of an automobile for fire-fighting purposes. It is thought that a \$6,000 car will be necessary for the requirements of the city.

Another for Peoria—The city of Peoria, Ill., will be the owner of five automobiles when the machine recently authorized by the city council for the fire department is purchased.

Columbus Council Approves—The city council has approved an ordinance for the establishment of a fire engine house in the hill-top section of Columbus, O., to be equipped with motor-driven fire apparatus.

West Chester Wants Apparatus—West Chester, Pa., is contemplating the holding of a special election to determine whether the town council shall be authorized to borrow \$25,000 for the purpose of purchasing motor fire engines.

Portsmouth Adopts Fire Wagon—The Pope Hartford Motor Car Company delivered a motor fire wagon to the city officials at Portsmouth, N. H., recently, the vehicle being driven over the road from the factory to Hartford. It was put into service at once.

Rike Kumler Company Cars—The fleet of cars shown in the illustration comprises the delivery equipment and private cars of the Rike Kumler Company, Dayton, O. All are equipped with Aplco electric lighting systems. The delivery cars are Speedwells.

Beverly Trying Out Fire Wagons—The city officials of Beverly, Mass., have been testing out various makes of motor apparatus to be added to its fire equipment, and it is expected that a decision will be reached shortly and at least one will be added to the department.

Fire Wagon Meets Requirements—The Minneapolis, Minn., council committee has recommended for purchase a Nott Fire Engine Company gasoline pumping engine, contracted for in March at \$6,500, providing the machine filled the efficiency requirements. Tests thus far have produced results above specifications.

Motorizing Houston Department—Fire Commissioner Colehouse of Houston, Tex., has placed orders with the American-La France Fire Engine Company, for a 65-foot aerial truck, one motor water tower and a triple combination auto engine. The aim of the Houston fire officials is to motorize the entire department in that city.

Philadelphia in Difficulty—As the bids submitted to the Philadelphia department of public safety for motorized fire

equipment exceeded the \$35,000 available for that purpose, there is serious question as to whether the present horse-drawn equipment will be superseded in the near future, and the preliminary establishment of a "flying squadron" has been indefinitely postponed.

Cincinnati in the Market—Safety Director Cash of Cincinnati, O., will soon advertise for bids to furnish the city fire department with automobiles as follows: One runabout for the fire alarm superintendent; one runabout for the mechanical superintendent, and one runabout for each of the two fire marshals. The runabouts should have 20 to 40 horsepower. The city will also buy two combination pumping engine and hose wagons of 70 horsepower each and four combination chemical engines and hose wagons of 50 horsepower each.

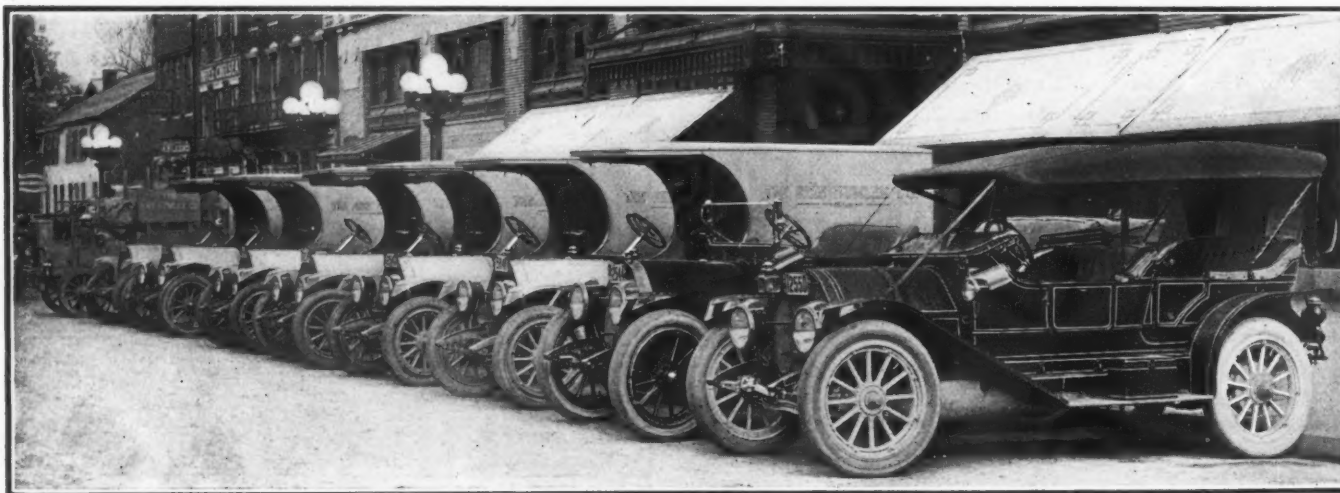
Penn Yan Buys Apparatus—The Ellsworth Hose Company of Penn Yan, N. Y., has placed an order with the Eureka Fire Hose Company, Syracuse, N. Y., for one 32-horsepower combination motor truck and chemical engine made by the Seagraves Manufacturing Company, Columbus, O. The apparatus weighs 3 tons, carries 1,000 feet of fire hose, 150 feet of chemical hose, one 40-gallon tank for chemicals, one 21-foot extension ladder, one 12-foot straight ladder, will travel 25 miles per hour and costs \$2,400.

District Service to Be Motorized

WASHINGTON, D. C., July 14—Motor cars are rapidly replacing horses in the municipal service of the District of Columbia. Included in the district appropriation bill just enacted by congress are appropriations for the purchase of motor vehicles for the use of the building inspector, superintendent of sewers, electrical engineer and superintendent of street cleaning. A number of other district officials are already provided with machines for their official duties.

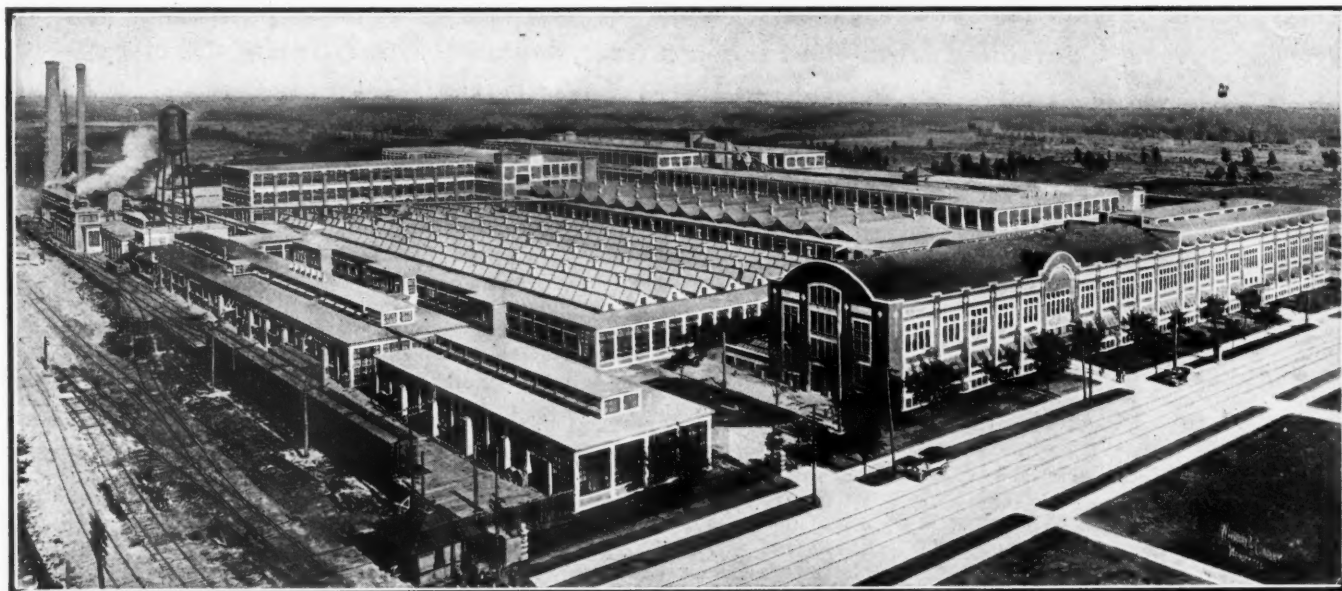
Experience has demonstrated, according to district officials, that motor cars give a greater measure of service than the horse-drawn vehicles and are operated at less cost. The policy of the district commissioners is to gradually replace the horse-drawn fire apparatus with motor-propelled engines, hose wagons and trucks.

The District of Columbia at present is the owner of two pieces of motor-driven apparatus, a fire engine and a combination fire engine and hose wagon. Provision is made in the district appropriation bill for the purchase of another combination fire engine and hose wagon at a cost not to exceed \$9,000. Bids for the purchase of this apparatus will be called for in the next few weeks.



Delivery and private cars used by the Rike Kumler Company, Dayton, O. All are equipped with Aplco electric lighting systems

Factory Miscellany



Birdseye view of the handsome factory buildings of the Pierce-Arrow Motor Car Company, 1695 Elmwood avenue, Buffalo, N. Y.

IMPERIAL Enlarges Plant—The Imperial Automobile Company is now owner of the factory buildings in Jackson, Mich., where the Buick Motor Company has been manufacturing automobile trucks. The Buick will transfer its Jackson business to the main plant at Flint. The buildings in Jackson cover 7 acres and the company will enlarge its output from about 1,700 to upward of 5,000 vehicles.

R-C-H Uses Tents—The plant of the R-C-H Corporation at Detroit, Mich., being in need of more room for the production of 1913 cars, is using three large tents for the purpose.

Grant Factory Moved—The Grant Motor Car Company, manufacturer of the Grant Six, is now moving into its new factory at One Hundred and Fifty-second street and St. Clair avenue, Collingwood, O.

Lewis Company Growing—The Lewis Spring and Axle Company will enlarge its Jackson, Mich., plant and probably will build automobile trucks of 9 tons capacity. The company has been experimenting with cars of this type for some time and one of them has proved satisfactory.

Stewart Company Leases Plant—The newly-organized Stewart Motor Corporation, Buffalo, N. Y., capitalized at \$250,000, has leased the factory of the Niagara Machine & Tool Works at Jefferson, Superior and Randall streets. The company will manufacture light-capacity freight automobiles.

Work Resumed at Fremont—Building operations which have been delayed for some little time at the Lauth-Juergens plant at Fremont, O., have been resumed since the arrival of the steel for the framework of the new addition. Sales-manager H. S. Diller announces that the building will be completed within the next 30 days.

Cole Factory Expands Again—President Cole of the Cole Motor Car Company, Indianapolis, Ind., has announced that arrangements have been made to construct another addition

in the form of a wing to the Cole factory. The new wing will be adjacent to the one built a short time ago and will be erected at an approximate cost of \$100,000.

To Build Light Trucks—The Ideal Motor Car Company, Columbus, O., has been incorporated with a capital of \$20,000 by C. G. Amendt, J. C. Reichart, D. N. Postlewaite, T. J. Shaffer and E. Braugnier. The object of the company, which is composed mostly of Detroit capitalists, is to establish a plant for the manufacture of light delivery trucks.

To Manufacture in Rochester—With the discontinuance of the Jenkins Motor Car Company, Rochester, N. Y., in the manufacture of pleasure gasoline vehicles, the Cole Rochester representatives have taken over the entire plant of the Jenkins company in the eastern section of the city. They have acquired new capital and will manufacture and sell automobiles under the name of the Shafer-Decker Company.

Addition for Kinsey Plant—A five-story brick addition is being built to the Kinsey Manufacturing Company's plant, Toledo, O., and will be ready for occupancy in the early winter. The dimensions of the new building will be 125 by 100 feet. It is designed solely for manufacturing purposes and will necessitate the employment of 300 more men. The Kinsey is one of the Willys-Overland group of automobile concerns.

Goodyear Makes Big Addition—The Goodyear Tire & Rubber Company, Akron, O., has commenced work on another new building to be added to its present group. It will be 400 feet long, 80 feet wide and six stories high. The new building will be of brick and stone and will be fireproof. The same company has let contracts for two-story additions to two of its present large buildings. When completed the Goodyear company will have a plant containing 266,000 square feet of floor space. The enlarged factory will have a capacity of 8,000 tires a day and will give employment to 2,000 additional men.

Newest Ideas among the Accessories

Refreshment Basket for Touring; Tire Pump Driven by the Engine; Acetylene Lighting System Controlled from the Driver's Seat; Channel Steel Spring Bumper; Tire Holder for Attaching Extra Tires to the Back of a Car



Hawkeye Refrigerator Basket

JULY touring has charms which are easily marred by a lack of general comfort. The carrying of fresh and cool eatables and drinks greatly increases the pleasure of summer motoring, and to assist the automobilists in this direction, the Burlington Basket Company, Burlington, Ia., manufactures the Hawkeye refrigerator basket, Fig. 1. The latter is made of sheet metal covered with wickerwork to afford better insulation against exterior heat. The basket is divided into several compartments, one for ice, one for fluids and one for other refreshments.

Dewey Engine-Driven Pump

A new type of tire pump which fits into the spark-plug hole of the engine cylinders and which is operated by the engine suction and compression, is the Dewey pump, Fig. 2. It consists of a pump cylinder 1 foot long and 2 inches in diameter, the bottom plate of which is equipped with a pipe connection threaded to fit into a 7-8-inch opening. Inside the cylinder is a piston which may be moved in the cylinder by air pressure against one of its sides and which is not fitted with any connecting-rod. Tightness against the cylinder walls is insured by a packing ring. The upper cylinder plate is perforated with a central hole and several holes disposed in a ring around the former. All holes serve as seats for check valves, the central one seating when the piston is drawn toward the engine cylinder by suction, while the other check valves seat when engine compression pushes the pump piston upward. This construction admits fresh air into the pump chamber above the piston on the engine-suction stroke and expels it through the

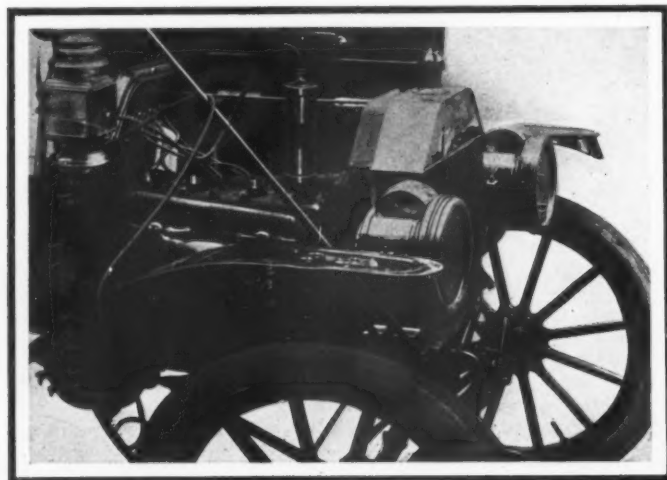


Fig. 2—Showing method of attaching Dewey tire pump

central check valve and the tubing attached thereto by a compression coupling during the compression stroke. The compressed air forced out of the pump is transported through a flexible tube wound with a fabric to the tire valve. With this pump a flat 28 by 3-inch tire can be inflated to 60 pounds in about 3 minutes. This automatic tire pump is made by the Dewey-Anderson Company, Toledo, O., and is sold in the East by the Lowe Motor Supplies Company, Fifty-fifth street and Broadway, New York City.

Mondex Acetylene Lighting

Most recent among the additions to the lighting-system field is the Mondex outfit of the Aristos Company, 250 West Fifty-fourth street, New York City. This system is of the acetylene

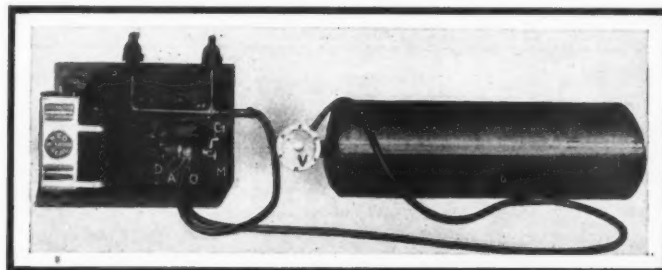


Fig. 3—Tank and control of Mondex lighting system

type and is entirely controlled from the driver's seat, the turning of a knob admitting gas to the lamps and that of a small crank switch producing a series of sparks between the igniter points over the lamp burners. As Fig. 3 shows, the outfit consists of the dash fixture D which combines the office of acetylene admission valve and switch, of a reducing valve V which is attached to the gas tank, of a spark coil and of one igniter above each of the burners. The magneto may be used in place of battery and spark coil.

The construction of the component parts is illustrated in Fig. 4. V1 is the half of the regulator valve which is connected to the tank outlet and V2 is the other half. The mechanism contained inside the shells V1 and V2 consists of the grooved needle N, the levers L1 and L2, the circular fabric F and brass plate B, and the spring S which rests in the central recess of the part V2. The needle N seats in the central opening N1 of V1 which is attached to the outlet of the gas tank and its flat end bears against the lever L1 which is hooked to L2, the latter being attached to the plate B. The spring S presses against the other side of the plate B and its tension is regulated by the knurled screw K on V2. As the gas comes out of the tank and lifts the valve, the pressure inside V rises and tends to press the brass diaphragm against V2, being resisted to a degree varying with the adjustment of the spring S. At the same time, as the diaphragm moves away from V1, it draws with it L2 and thereby presses the pivoted lever toward V1, tending to press the needle N against its seat and limiting

the quantity of gas leaving the tank to the amount determined by the adjustment.

The dashboard fixture of the system is shown in detail in Fig. 4. The gas-valve part consists of a steel needle bearing against a brass seat and ending in the knob M, Fig. 3, where A shows the admission, and O the outlet port, of the acetylene passing through the dashboard fixture. The electric part of this device is the switch S₁, Fig. 4, which consists of a connector piece C, mounted on an insulation and turnable by means of the small crank C₁, Fig. 3. The connections for directing a spark to the igniters at the burners may be made so that either the battery or the magneto serves as a source of current. If the battery is to be used, the wire leading from the battery is connected to the terminal marked 1 and the igniter is connected to the terminal marked 3, the negative battery and igniter terminals being grounded. With this wiring, if the switch is turned the piece C is brought to a horizontal position and closes the circuit with the coil in line and produces a series of sparks at the igniters. When the current for the sparks is to be taken from the magneto, 2 is connected to the spark-plug of one cylinder, the current normally passing through 1, the piece C and 2. If the crank C₁ is turned, the magneto current is sent through the igniters instead of the spark-plug it normally serves; in this case no induction coil is used. The igniters I are simple in construction, the wires entering at the bottom of the insulator B₁.

A New Eclipse Channel Bumper

The Emil Grossman Company, 250 West Fifty-fourth street, New York City, has brought out a new type of spring bumper,

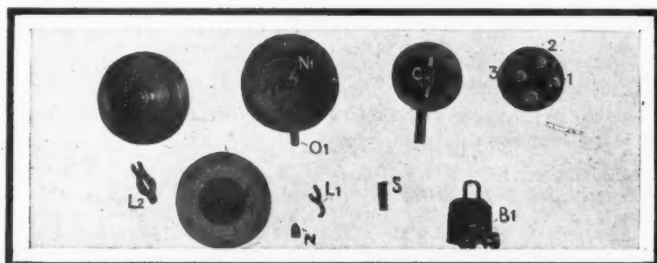


Fig. 4—Detail of Mondex dash control and switch

named the Eclipse. The bumper is made of steel throughout, the bar being of 2-inch solid stock and shaped as in Fig. 5. The attaching pieces are of stamped steel. The latter parts consist each of a short connecting bar support C, one end of



Fig. 5—New type of Eclipse steel spring bumper

which is attached to the bumper bar while the other is formed as a triangular plate with one edge shaped with ratchet serrations R which engage similar serrations on another triangular plate. Both plates are slotted to permit of passing through them three bent steel bars which are bolt-threaded at their outer ends. These bolts grip the channel of the frame side member with their bent ends, while nuts are placed on the bolt ends and there are so tightened as to give rigidity.

The Glover Rear Tire Holder

To make possible the attachment of tires to the rear of such cars as are not designed with provisions for this end, the Glover Manufacturing Company, 250 West Fifty-fourth street, New York City, has designed the tire holder, Figs. 6, 7 and 8. This tire holder is made of steel bars and is attached to the rear cross-member of the chassis frame by means of four bolts. In order to hold the tire in position on the car the holder arms A₁ and A₂ are fixed to each other by the supports penetrating the triangles T, one of which is riveted to each A₁ and A₂. The supports are attached to the chassis. The third arm A₃ slides between the triangles attached to A₁ and A₂. A passage is cut out along most of its length, this passage being formed by a series of circles having part of one another's area in common. A bolt B passes through a hole in each triangle and through one of the circles of the passage cut in A₃; one end of the bolt carries a head while the other is bored with a hole through which the hook of a padlock is passed. The four supports S₁, S₂, S₃ and S₄ are both fixed to the triangles and the chassis member by nuts holding the whole system tight. To prevent rattling at the points of attachment to the chassis, the ends fixed to that member are threaded in two ways, right-handed at the end and left-handed a small distance from it. On each support end a nut is fixed in front and one in back of the chassis channel, being spaced by an iron sleeve and prevented from coming loose by recesses inside the nuts. Owing to the movability of A₃, any size of tire may be carried.

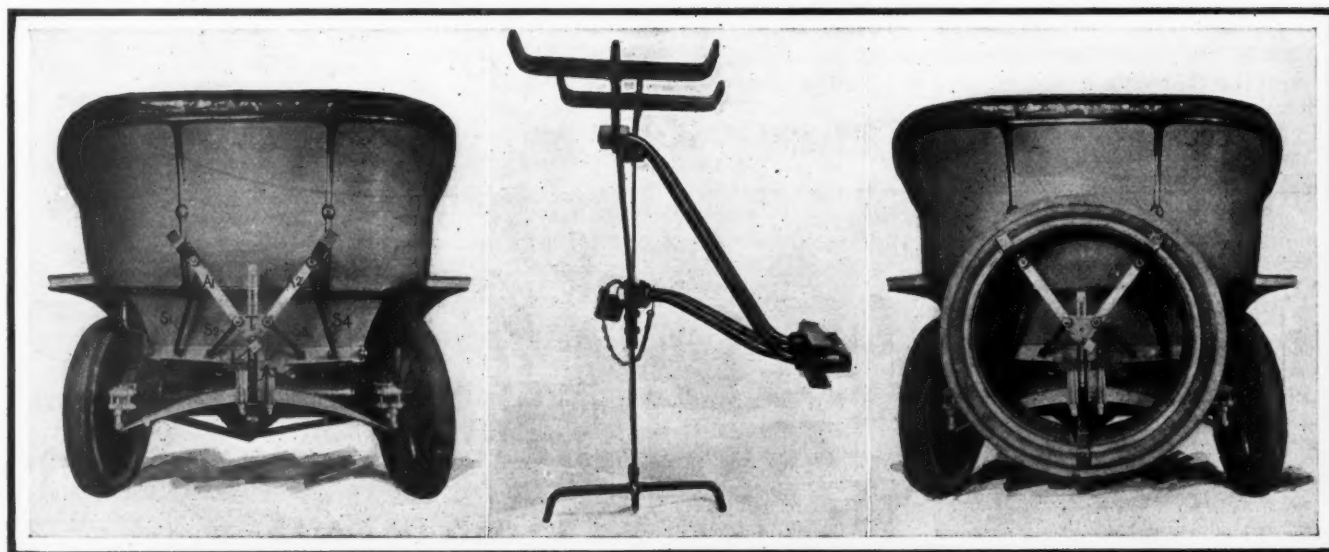


Fig. 6—Detail of Glover rear tire holder. Fig. 7—Side view, showing method of attaching. Fig. 8—Holder in place

Patents Gone to Issue

H **HEADLIGHT Adjuster for Automobiles**—Comprising connecting-rods and leverage whereby the headlights are always turned in the direction of the front wheels. This patent relates to a mechanism as shown in Fig. 1, where G is the cross-rod of the steering gear. Two lamps are carried by the supports S S. The connection between the lamp supports and the steering equipment is by means of the lever L which, at its middle portion, is connected to the front axle, and at one end to the steering apparatus, while its other end is linked to the rocker arm R. The lamp supports are connected by a rod C, and a rod R₁ has one end secured to the rod C, and the other to the second end of the rocker arm.

No. 1,032,309—to Pembroke N. Squires, Cañon City, Col. Granted July 9, 1912; filed August 5, 1911.

Differential Gearing Construction—

In which the connection between gear casing and axle sections may be broken by the movement of a lever system controllable by the driver.

This patent describes a differential gearing, Fig. 2, which operates in combination with a divided axle and which includes a casing D provided with teeth at its ends. Collars C are slidably mounted on the axle section A₁ and A₂ and their ends are provided with teeth adapted to engage those on the casing D. Keys fixed to the axle sections engage the collars, and slidably mounted pins P carry depending arms which engage the collars. Means B are provided for moving the pins within the supports and thereby engage or disengage the teeth on the casing D with those on the collars. To the casing D a gear wheel G is fixed which is driven by a pinion P₁.

No. 1,032,261—to Elmo L. Wright and Thomas M. Biossat, Jr., Lafayette, Ind. Granted July 9, 1912; filed October 20, 1911.

Vehicle Supporting Device—Comprising rods and guides therefor which permit a suitable way of mounting pneumatic suspension members on the running-gear.

In Fig. 3 is illustrated the subject of this patent which refers

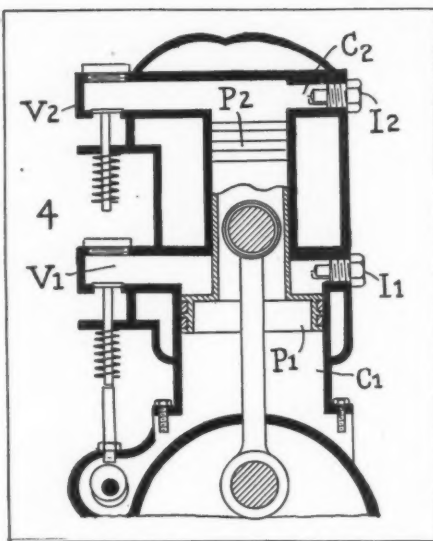


Fig. 4—Moertzsch's internal combustion motor

to the combination of a body-frame, an axle and a pair of running-stress transmitting devices. One of these devices is located at each side of the body-frame and is interposed between the same and the axle. Each device consists of a pair of rods R held in alignment by guides G, the latter being connected by yokes Y. Body-supporting pneumatic cylinders C are pivotally connected to the yokes, being interposed between the yokes and the axle. One of the running-stress transmitting devices is pivotally connected to the axle in such a way that endwise movement of the axle relative to the frame is prevented, while the other device is so connected to the axle as to be capable of lengthwise movement relative to the same, permitting of free endwise tilting of the axle.

No. 1,031,759—to George Westinghouse, Pittsburgh, Pa. Granted July 9, 1909; filed October 15, 1910.

Internal-Combustion Motor—Cylinder and piston are worked with two portions of different diameters, permitting of alternate explosions in the cylinder portions.

The subject matter of this patent is an internal-combustion motor, Fig. 4, the cylinder of which has a wider and a narrower portion C₁ and C₂, into which fit piston portions P₁ and P₂. Above the end of each cylinder portion the cylinder expands into a lateral chamber in which the valve chambers V₁ and V₂ are contained, each being equipped with an inlet and an exhaust valve. Communicating with the lateral chambers are ignition devices I₁ and I₂. Means are provided whereby the sets of valves are operated alternately, and whereby alternate explosions in the combustion chambers C₁ and C₂ may be produced. This design and the mode of operation made possible by it results in twice as many power strokes on each crankpin as if an ordinary engine design were used. The consequence is that the running of the motor using cylinders of this design is equalized.

No. 1,031,809—to Hans Moertzsch, Detroit, Mich. Granted July 9, 1912; filed May 9, 1908.

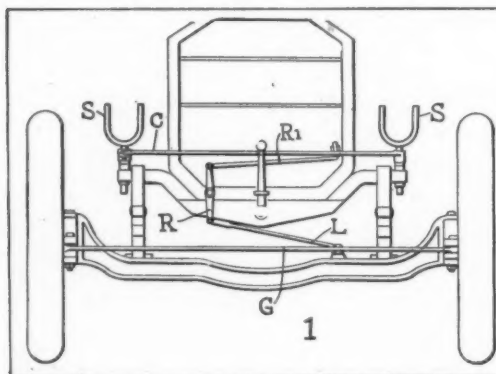


Fig. 1—Squires headlight adjuster

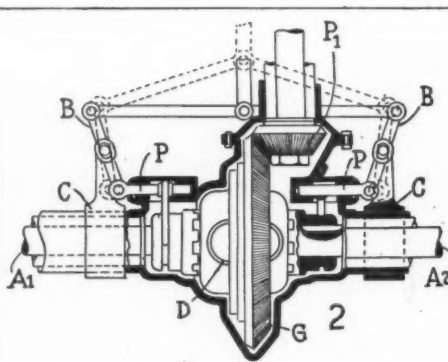


Fig. 2—Wright-Biossat differential

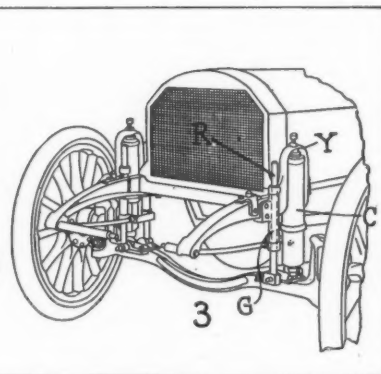


Fig. 3—Westinghouse's pneumatic suspension